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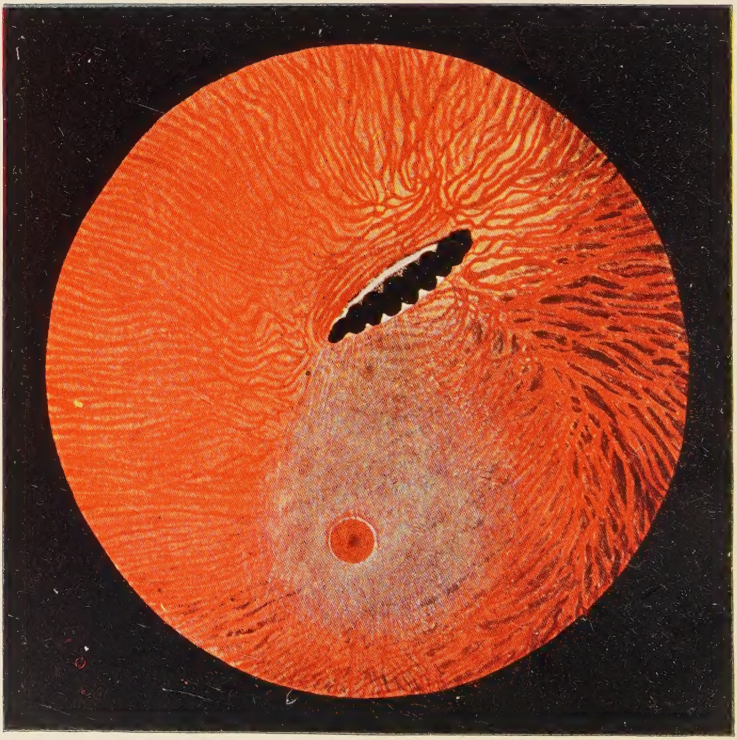

COLORED PLATE II.

Showing pecten, optic disk and macular region of the Owl. See chapter on Comparative Ophthalmology. Painted by A. W. Head, London, to illustrate Casey Wood's article on the Eyes and Eyesight of Birds.

THE

PRACTICAL MEDICINE SERIES

COMPRISING TEN VOLUMES ON THE YEAR'S PROGRESS IN MEDICINE AND SURGERY

UNDER THE GENERAL EDITORIAL CHARGE OF

GUSTAVUS P. HEAD, M. D.

PROFESSOR OF LARYNGOLOGY AND RHINOLOGY,
CHICAGO POST-GRADUATE MEDICAL SCHOOL

VOLUME III.

THE EYE, EAR, NOSE AND THROAT

EDITED BY

CASEY A. WOOD, C. M., M. D., D. C. L.
ALBERT H. ANDREWS, M. D.
GUSTAVUS P. HEAD, M. D.

SERIES 1907

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Departments.

The Eye.

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INTRODUCTION.

Although the ophthalmic literature of 1906 has not yielded any epoch-making monograph, yet its volume has by no means diminished, thus rendering the task of culling from an overflowing supply of meritorious articles the comparatively few that figure in these pages. In spite of this forced selection the Editor is quite conscious of having been obliged, owing to limited space, to neglect what, with a larger number of pages at his disposal, would certainly have been included. Moreover, he has been obliged to dismiss in a few words many practical papers that he at the time felt to be worthy of a better fate. The same remarks apply to the selection of the illustrations; it has not always been an easy task to decide whether a certain space would be more properly filled by text or a picture.

In these selections the Editor wishes once more to acknowledge the free use that he has made of the valuable reviews and abstracts of *Ophthalmology,* for which he has to thank Dr. H. V. Würdemann and his eminent staff of assistants.

When the occasion seemed to require them the Editor has made comments upon certain contributions and for these he is, of course, personally responsible.

CASEY WOOD.

Chicago, April, 1907.

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THE EYE.

THE EYE.

EXAMINATION OF THE EYE.

Recent Improvement in Perimetry are discussed by F. A. Davis.[1] After referring to various new methods of mapping out the limits of the visual fields and the detection of scotomata—especially the plans of Uhthoff, Jackson, Hess, Schloesser, Haitz, and the Sinclair-Bjerrum method—he describes and illustrates the Haitz procedure, quoting directly from that author, as follows: "All the campimeters should be printed on dull-gray carton [the accompanying figure in this volume is of necessity on white paper—Ed.], free from all reflections. The eight-sided figures should have strongly marked contours of clear gray. They have for their object to excite fusion. At the same time it is not necessary that the two campimeters be viewed intoto; when portions of each are fused they fulfill their mission. On both sketches are two diagonals and should appear in relief and, therefore, should be printed white. These spur the eyes to maintain the normal position as they cross at the fixation point and will double by vertical or horizontal deviation. There is a break in the center of each diagonal of $1\frac{2}{3}$ mm., or $\frac{1}{2}°$, in order that the eye may not be blinded by any white at the fixation point and so be able to distinguish saturation differences. The campimeter which has division into degrees is always placed in front of the eye to be examined. Two control signs, disks, are placed at the ends of one of the diagonals in each figure, and if binocular vision is present four disks will be seen, one at each corner of the stereoscopic picture. The divisions on the campimeter are in degrees from 0° to 10°, so that two adjoining lines are

(1) Ophthalmic Record, May, 1906.

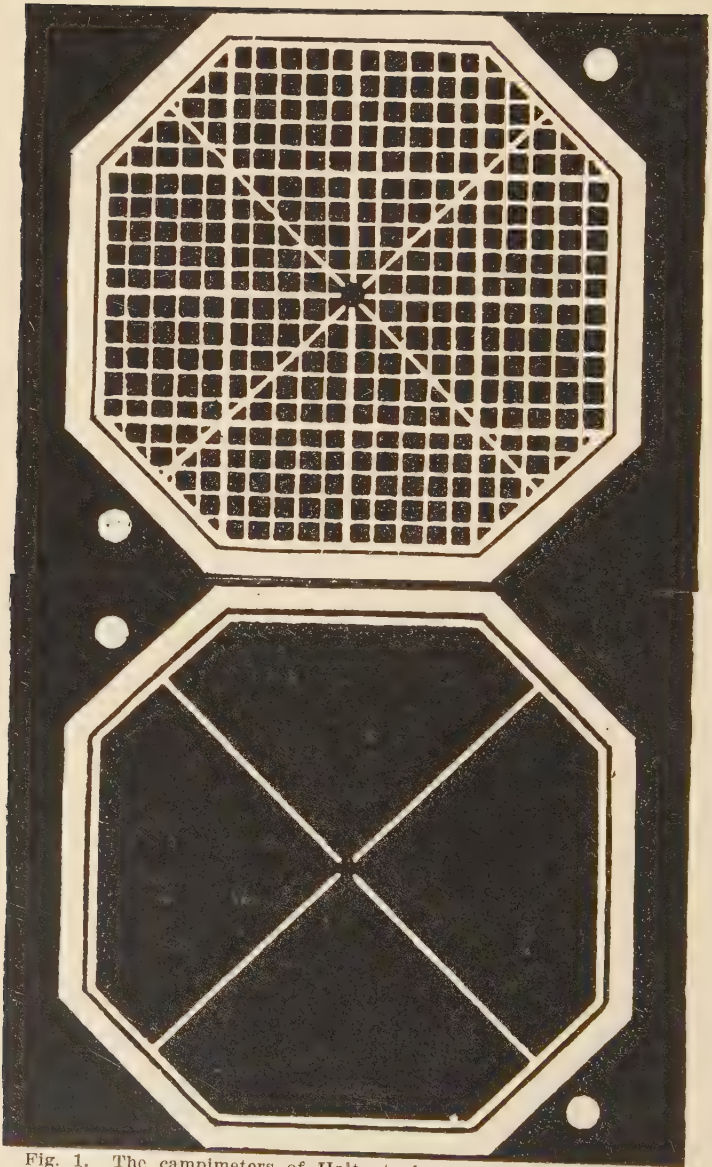

Fig. 1. The campimeters of Haitz to be used with a stereoscope (Davis).

seen under an angle of 1°. The size of the intervals was determined empirically by finding the nasal border of the blind spot in the horizontal meridian. Its distance from the fixation point was first measured in the case of a number of emmetropes in angle degrees on the perimeter, and then in linear units in the stereoscope. Neither the different interpupillary distances nor the distance of the eyes from the stereoscope lenses has any appreciable influence on the test. Tests are performed as in perimetry in general, but one should be careful to avoid holding the test-square over one of a common contour. If one is testing the meridian 45° the square should be drawn alongside, not over the diagonal. In going from the nasal side toward the middle of the field the carrier should be held upright. The holders should be of the size of a needle and the test objects of two sizes, one 1¼ mm. square and one 2 mm. square. The smaller one is to be used in testing the zone between 0 and 5, the larger the zone between 5 and 10. The Heidelberg color papers make the best test objects. Ametropes should wear their correction."

Priestly Smith's New Scotometer was intended chiefly for the *diagnosis of glaucoma,* but, like other perimeters, is equally available for mapping out the visual fields in other diseases.[1] It consists essentially of a disc of millboard covered with black cloth and figured on the back with the degrees of the circle. The test object is a small cutting of gray wool which is laid upon the cloth at any desired distance from the center. In the case of suspected glaucoma it should be placed at 25° from the center, as shown by a faint mark on the cloth, and the disc should then be slowly rotated. Should it nowhere disappear or grow dim, in all probability glaucoma does not exist, for, as Bjerrum has shown, the defect in the glaucoma field is almost always radial or sector like, and, with a delicate test could be traced inwards. If a defect is found its extent should be noted on the graduated circle so that it can be used for future comparison. Other circles may be explored if necessary.

Binocular Pupilometer. A review of the various methods employed in the construction of pupilometers is

(1) British Med. Jour., March 17, 1906.

detailed by Ohm.[1] The simplest is measuring with the compass or the comparison with black discs or gauges held near the eye. In the apparatus of Schirmer and Hess the image of the rod measure coincides by means of reflecting mirrors with the plane of the pupil; in those of Dojer and Schadow, the picture of the pupil is thrown upon a scale in a telescope. In those of Galezowski, Dubujadoux and Sommer, two threads are adjusted as tangents to the pupil. The best method is the photographic, as it fixes the pupil in all its phases. This excepted, all others measure only one pupil at a time. Since, however, the comparison of both pupils is very important for numerous physiologic and pathologic questions, Ohm devised an apparatus in which by means of a system of prisms the images of both pupils are brought side by side and can be measured with great accuracy.

The Argyll-Robertson Pupil is defined by Bach[2] as follows: When the pupil does not react either to direct or indirect light stimulus or nervous or psychic irritation, but contracts promptly and to full extent to convergence. It is generally contracted, the miosis being attributed to the loss of sensory irritation. He believes that the Argyll-Robertson pupil in tabes is not directly dependent upon cervical disease, but that it is due to degeneration of a bundle or tract of fibers leading from the corpora quadrigemina to the medulla, or in rare cases also to irritation of an inhibitory center in this locality, and that the miosis which is so frequently present is due to degeneration of spinal sensory tracts and the loss of psychic irritation, and, therefore, of tracts leading from the cerebrum to the medulla oblongata.

The Significance of the Pupillary Reaction During General Anesthesia. The loss of the corneal reflex has been used as *an index of the degree of narcosis for many years,* but Northrop[3] believes it to be unscientific and useless, and its application a score of times during a single operation, positively barbarous. While there is no one signal that is an infallible guide, the pupillary reaction is the nearest approach to it. A rapidly dilating pupil means

(1) Centralb. f. pkt. Augenheilk., August, 1906.
(2) Die Ophthal. Klinik, June 22, 1906.
(3) Northwest Medicine, April, 1906.

danger, and a fixed, dilated pupil extreme danger. A contracted, immobile pupil usually means safe surgical anesthesia; oscillation indicates diminishing narcosis. The pupil is sometimes modified by the manipulation of excessively sensitive tissue or by suddenly changing the patient's position. In the primary stage of ether anesthesia the pupils generally dilate but react well to light. As ether is added, the pupil contracts more and more, and reacts sluggishly to light, finally becoming immobile, having reached the "mid-point" (Hartley) of safe surgical anesthesia. If the anesthetic be pushed, the pupil will dilate and finally cease to react, the cornea becomes insensitive, and danger signs appear, indicating the approach of cardiac or respiratory failure, or both. If the ether be discontinued the patient will begin to react, the pupil gradually going back through the same series of changes reversed, or it may dilate suddenly, reacting to light, and the patient begins to struggle or vomit. In chloroform narcosis the changes are similar, but more rapid, and must be watched for with even more care. A point to be remembered is that the cornea is affected early by chloroform.

Two Cases of Lid-Closure Pupil Reflex. This phenomenon, known in America as Gifford's sign, was observed by Ballantine[1] in a poorly nourished girl of 17 who was suffering from chorea, but the latter condition was found to have no causative influence. The reflexes and eyes in every particular were normal, except for a slight fear of light, when she had a sudden lid spasm, after which it was observed that the pupils were contracted, then slowly dilated. This pupillary contraction could be induced by asking patient to close the lids while they were being forcibly held apart. It was also found that this contraction could be induced in the same way while the lids were being actually held away from the globe, thus controverting the theory that the contraction is due to pressure upon the globe. The same phenomenon was observed in a young woman, highly myopic, who had no reaction to accommodation and convergence. A search of the literature shows that it was first described by Galassi, then by Gifford (Omaha), Westphal, Pilz, Antal,

(1) Ophthalmoscope, February, 1906.

Kirchner, Roth, Franke and Schanz. There seems to be no agreement upon the diagnostic significance of the reflex. The author believes the reflex is an associated action of the sphincter iris and orbicularis muscles.

The Metallophon, an Apparatus for the Detection of Metallic Foreign Bodies in the Interior of the Eye, is described by Weiss.[1] The apparatus is practically a Wheatstone bridge which measures the electric resistance of the tissues of the eye between two electrodes applied on the sclera while the latter is searched all over. A relatively small piece of metal, *not* necessarily iron or steel, placed between the electrodes increases the resistance and is indicated by the ringing of a telephone connected with the wire measure. Only very weak currents are to be employed.

COLOR SENSE AND COLOR BLINDNESS.

Clinical Methods of Examination of the Color Sense. Collin[2] discusses the insufficiency of the perimetric tests with small colored objects and of Holmgren's skeins, as both may yield opposite results in the same case. For clinical diagnosis only such methods are admissible, which allow of separate testing of central and peripheral color perceptions. This is obtained by means of the *electric perimeter of von Michel.* The test objects, illuminated by an electric lamp, consist of two round, rotable discs. The lower contains five glasses of different colors (green, yellow, red, blue, white), as much saturated as possible by combination of a number of differently colored glasses, and equivalent as to light adaptation. The upper disc has six square-shaped holes with sides of 1, 2, 5, 10, 15, 30 mm. length, in order to change the sizes of the underlying colored fields. An exclusively focal fixation is insured by setting the carrier with the square of 4 mm. on the point of fixation of the perimeter, a small plate of ivory. For ascertaining the peripheral borders the areas of 100 mm. are recommended. The color of the perimeter itself is gray, not black, to secure a neutral background and to avoid contrasts.

(1) Centralbl. f. pkt. Augenheilk., August, 1906.
(2) Zeitschr. f. Augenheilk., p. 305, 1906.

Color Sense and Railway Service. Red-green blindness is the most important of the congenital disturbances of the color sense. Other forms are very rare and are generally due to affections of the visual organ. They are blue-yellow, blue, and violet blindness, monochromatopsia and total color blindness (achromatopsia).

Quantitative defects (dyschromatopsia) may be encountered in people with and without color blindness. They require more intense light, larger objects and a longer time for the recognition of colors. Békéss[1] found 5 cases in 655. All these forms are congenital.

The acquired color defects are generally caused by ocular diseases which by themselves exclude railway service. *For railway employes only persons with normal color perception should be accepted.*

Békéss enumerates 17 different tests. A test applicable for railway purposes must have no or few sources of errors and must allow of easy and rapid application. Such tests, e. g., those of Holmgren and Stilling, are accused of not disclosing defective color sense sufficiently. Thus Nagel found, out of 300 railway employes previously examined with Holmgren's skeins, five color blind; Collins, out of 1,778 soldiers of the railway brigade, previously examined with Holmgren's and Stilling's tests, 0.73 per cent. color blind and 1.74 per cent. affected with color anomalies. Békéss, however, thinks that this is not a fault of the method but unskilfulness in its employment. Therefore railway surgeons must be taught to conduct these examinations correctly. One test, applied accurately, is better for the railway surgeon than the introduction of more. Békéss considers the methods of Holmgren, Stilling and Nagel as practically equivalent. Any new employe who passes these examinations is to be accepted. Those who make mistakes must be reëxamined by an ophthalmic surgeon.

In 1897, Békéss constructed a lantern with which the natural conditions existing on railways can be imitated. The same kind of lights and colored glasses as in the semaphores are used, the intensity of illumination is regulated by diaphragms, and, by interposition of glasses the optical relations of the atmosphere (fog, snow, etc.) can be simulated. The lantern proved very valuable, particu-

(1) Zeitschr. f. Eisenbahnhygiene, 7, 1906.

larly in cases which are to be designated as weak in colors, and is highly recommended for the examination of railway employes.

[Americans must not forget the effective lanterns devised in this country by a number of our own ophthalmologists. —Ed.]

REFRACTION. AMETROPIA AND ITS TREATMENT.

Regarding the Notation of the Axes of Astigmatism. Cylindric Lenses. This subject is considered by Oppenheimer[1] under the following queries:

1. How shall the degrees of meridian be marked? On the upper or the lower semicircle?
2. How shall the semicircle be divided? Into 90° or into 180°?
3. Where shall the numeration begin? i. e., where shall zero be placed?
4. In which direction shall the graduation be made? In the direction of the clock face or the reverse?
5. How shall the axis be designated? As though viewed by the patient or by the surgeon?

They are answered as follows:

1. It is recommended that the graduations be made upon a circle so that the meridians may be designated both above and below.
2. 180°.
3. Unimportant, so that it be universal.
4. Same as 3.
5. The so-called *normal schema* (recommended by Knapp) and used by the majority of ophthalmologists in America and by many in England.

[Probably many ophthalmologists in this country would decline to be included in category five.—Ed.]

A Time Saving Device for Refraction. Three lenses are set in one handle, in combinations of —.25, +.25 and a plano. The same combinations are used with a plano only the plus and minus lenses may be greater or lesser in their strength. Lakin[2] uses these lenses to add to or subtract from the lenses already before the patient's eyes in the trial

(1) Wochschr. f. Therapie des Auges, March 22, 1906.
(2) Ophthalmic Record, February, 1906.

frame. He finds it much handier than doing this same thing with trial case lenses.

A Case of Hypermetropia of Twenty-one Diopters Simulating Myopia is described by Stieren.[1] The patient was aged 15 years, and a middle-grade imbecile, with one eye microphthalmic and the other hypermetropic to the extent of twenty-one diopters. The vision was 1/c, without and 1/xii with correction. He could read all ordinary type with or without correction.

Hereditary Influences of Myopia. Though often regarded as a simple error of refraction, grave complications may arise which altogether overshadow the original condition. Myopia is frequently inherited. In a series of 687 cases examined by Claud Worth[2] 33 were malignant and 654 were uncomplicated. Of the latter 56 per cent. gave a family history of myopia, while of the former in only 24.25 per cent. was evidence of heredity found. In one family, whose pedigree was shown, nearly all the males were myopic and none of the females; but the myopia was transmitted through the female line. The amount was in all cases examined about the same—viz., 10 to 12 D. with some astigmatism. The fundi showed crescents, but grave complications were wanting. Curiously enough in this family all the healthy eyes were blue, and all the myopic ones were brown. Night blindness was only admitted in one family. The statistics of the 687 cases are as follows: Of 313 with no family history of myopia, 163 were males and 150 females. Of 374 with a family history of myopia, 228 were males and 146 females. This showed the usual preponderance of myopia in men was increased in those in which myopia was hereditary. Of the 374 cases in which a family history of myopia was obtained, in 159 the parents were myopic, but the myopia was present in uncle, aunt or grandparent. The fault was on the mother's side in 104 cases, on the father's side in 33 cases, and on both sides in 32 cases.

[In a report of a case of family nystagmus the Editor noted that for four generations the brunettes had invariably nystagmus and myopia; the other members had blue and healthy eyes.]

(1) Ophthalmic Record, September, 1906.
(2) Medical Press, March 14, 1906.

The Treatment of Myopia. From his large experience in this condition Sattler[1] draws the following conclusions: 1. Full correction may check the progress of myopia if a sufficient distance for near work is maintained and a too great inclination of the plane of fixation is avoided. 2. In young persons, full correction is tolerated in myopia of 10 D. and more. 3. If a progression should take place even then, it generally is slight. 4. Also in high degrees of myopia a reading distance of at least 20 to 25 cm. must be secured by corresponding correction. 5. A timely correction seems to be a protective against the dangers with which a myopic eye is threatened. 6. Insufficiency of convergence is generally averted by full correction. 7. Muscular asthenopic troubles require tenotomy of the external recti in exophoria of any amount, or prisms besides full correction. 8. In very high myopia (18 D. and more) to the end of the third decade of life the extraction of the transparent lens with the concave lance-shaped knife is to be recommended. 9. Primary extraction surpasses primary discission by a smaller number of interferences, more speedy restoration of good vision, greater safety as to loss of vitreous, avoidance of increased intraocular pressure, less danger of postoperative detachment of the retina.

Bilateral Removal of the Lens in High Myopia. The following case was operated on by Howard Hansell:[2] H. W., aged 18, with both eyes myopic, R. — 21 D., L. — 23 D., was wearing R. — 12 D., L. — 13 D. With full correction V. = R. 20/c, L. 20/lxx. The ophthalmoscope showed in the right marked changes in the fovea and large posterior staphyloma; in the left a small extravasation of blood occupied the foveal center. His occupation as clerk required constant close work, and he had depended solely on the left eye for two years. The field of vision was not restricted at the periphery. At the point of fixation in either eye, the image was distorted and partly concealed. Under potassium iodid the blood slowly absorbed from the left fovea, but later two more minute hemorrhages occurred. After being given a daily sweat of two hours for twelve days, vision was improved for a time, then extravasations recurred, until the disorganized patch equalled in

(1) Klin. Monatsbl. f. Augenheilk., p. 465, 1906.
(2) Am. Medicine, October, 1906.

diameter the nerve head. Each lens was needled twice, then extracted, several weeks intervening between operating on each eye. The capsule of the left was not needled after extraction, but asbosrbed by dionin. At present V. R. = 20/lxx with + 1.c.ax.135°; L. = 20/1 with + 1.c.ax.135° and with + 3 added he is able to read with either eye .50 D. at 12 inches.

The author reviews the opinions of many oculists. Though generally admitted that operation for high myopia is justifiable in selected cases, the restrictions and contraindications named make it practically never indicated. However, it is generally agreed that the myopia should be 17 D. or more; the subjects under middle age, myopia progressive; vision low, even with correcting lenses; insignificant fundus changes; inability to wear glasses; asthenopia and incapacity for work. Hansell thinks myopia, 15 D. or more, progressive after careful refraction, independent of the fundus changes, is suitable for operation because of (1) resultant atrophy of the chorioid and degeneration of the retina at the posterior pole; (2) severe and constant strain in seeing the diminished images through the strong glasses tends to increase the myopia; (3) prohibition from many occupations; (4) checking fundus degeneration. Detachment of the retina does not seem to be influenced by operation.

Among the benefits named following operation, the most important is the cessation of the pathologic processes in the fundus. The writer mentions the dangers and discusses the accepted methods of operation. He considers discission and linear extraction the safest and most rapid. As to bilateral operation it is generally conceded that the danger of loss of the second eye is greater than the possible benefit and that binocular single vision is practically unattainable. The writer believes that when structural changes in the fundus are not too great the second eye may be operated on, and is optimistic in the hope that prism practice and the daily use of both eyes will recultivate the fusion center and the convergence.

Seeing Things Right Side Up. The paradox that we actually see things right side up, although our eyes are constructed to see them upside down, has never been satisfactorily explained. Anatomical reasons are sometimes

given, says Gradenwitz.[1] It is suggested that the optic nerves, which transmit the visual impression to the brain, cross each other, and that the inverted image of the retina will, therefore, be seen vertically. It seems that in all these explanations the theorist confuses the *subjective* visual impression and the merely *objective* optical phenomenon, viz., the production of an image on the retina.

That upright vision is quite independent of the position of the image on the retina may be inferred from the fact that on inclining the head we still see objects in their proper positions, although the positions of the images on the retina are changed. The question naturally arises: By what standard, conscious or unconscious, does the eye judge in the gaging the upright position of things independently of the position of the head? Is there perhaps some organ which acts like a carpenter's plumb-line or spirit-level and indicates the direction of a given line?

Sir Hiram Maxim has given some thought to this problem. His views were seriously influenced by a chance observation. One day, when he was tired from a long railway journey, he noticed, on looking at an incandescent lamp, and then closing his eyes, that a distinct image of the filament still remained, which is a well-known optical phenomenon. After turning his head to the right about 45 degrees still looking steadily at the lamp for about half a minute, he closed his eyes and placed his head in a vertical position. He then found that the image of the filament was inclined 45 degrees in the other direction. He now turned his head to the left, and again looked steadily at the lamp. On closing his eyes and placing his head in a vertical position, he distinctly saw two images of the filament crossing each other at about 90 degrees. This proved, to his mind, that the position of the head and the angle of the image on the retina had nothing whatever to do with seeing things right side up. Not only this, but it showed at the same time that we judge the position of objects on the retina by comparing them with some organ which is a part of the mechanism of seeing, and which is controlled by the attraction of gravitation, as are the instruments used by the carpenter and builder above referred to.

(1) Scientific American, June 9, 1906.

THE HYGIENE OF THE EYE.

Hygienic Value of Yellow. The use of yellow or orange-tinted glasses by persons who desire to protect sensitive eyes against brilliant light is recommended by Motais, of Angers. He has been using these yellow glasses for fifteen years.

These glasses, says the Paris *Cosmos,* give a remarkable illumination. The sky and objects are lighted up with warm tints, very agreeable to the eye. Besides, and despite this luminosity, they produce a quieting effect, so that with tints proportioned to the intensity of the light or to the retinal sensitiveness, the most sensitive eyes may be preserved.

They are the most agreeable, the intenser the light, and are consequently recommended to travelers in high latitudes or on the snow-fields of mountain regions, where they are exposed to the blinding rays of the sun. * * * They also modify, in summer, the brilliancy of the sands on a sea beach. In the mountains, on an automobile excursion, their illumination enables the traveler to regard the widest views without fatigue. Irritable eyes, even when they have normal visual power, will find it advantageous to substitute the agreeable impression of yellow glasses for the gloomy tint of blue or smoked glasses. This substitution is desirable when the visual acuteness of invalids is notably weakened, as in the many affections known as retinitis, chorioiditis, progressive myopia, atrophy of the optic nerves, keratitis, etc.

According to the investigations of Javal, continued by Tscherning and Sarazin, the double illuminating and quieting action of yellow glasses, apparently so contradictory, is explained by their suppression of the chemical rays of the solar spectrum. It may be remembered that about 1888 an English scientist who had devoted much time to ophthalmology strongly advised all persons who were earning their living with the pen never to use white paper when yellow could be obtained. When shall we see yellow glasses and yellow paper coming into hygienic fashion?

[Apart from lay enthusiasm, the Editor wishes once more to draw the attention of his confreres to the value of

amber tinted lenses in many cases where photophobia is an annoying symptom.]

Effects of Abnormailties of Eye and Ear Upon the Mental and Physical Development of Children. Bussey[1] points out clearly and forcefully the results of neglected eye abnormalities in children, and insists that in the vast majority of cases, crossed eyes in a child reflect more discredit upon the parents and the family physician than a bad case of talipes in which no effort at correction has been made. He notes the progress made in the movement initiated by Dr. Frank Allport for the examination of the eyes and ears of school children.

Advantages of Glasses for Railway Employes. Advocating the use of glasses by railroad men, Nelson Miles Black[2] thinks their advantages are: 1. Correction of refractive errors of men long in the service. 2. Protection against wind, dust, mist, rain, snow and sleet. 3. Relieving reflection when running beside bodies of water, from snow or sand. 4. Overcoming the disturbance of vision when running toward the rising or setting sun. 5. Doing away with the heat and glare from the firebox in stoking.

In order to obtain the opinion of ophthalmologists throughout the United States, a circular letter was sent out requesting answers to several questions embodying the points made in this paper. The gist of the replies is:

1. That the protection afforded by glasses is a distinct advantage to enginemen and firemen.

2. That the disadvantages of glasses in railway service are not sufficient to render an employe unsafe who wears them for protection or to correct a latent refractive error made manifest by increasing age.

3. That wearing glasses for protection of the eyes in railway service will tend to prevent the reduction in vision usually found occurring in enginemen at 40 to 50 years of age.

4. That the only method of eliminating glasses for distance in railway service in the future is to have all applicants for employment examined for latent refractive errors when they apply for a position, by men scientifically trained for such work.

(1) Iowa Med. Jour., Sept. 15, 1906.
(2) Amer. Jour. of Ophthalmology, February, 1906.

5. That it is the consensus of opinion among the ophthalmologists of the United States that an engineman or fireman wearing glasses on duty is as safe an employe as one without them, if not safer.

A Traveling Hospital in the Desert. The flying dust of the desert is particularly injurious to the eyes. An article in *La Nature* (September 29, 1906), by Jacques Beyer, states that Sir Ernest Cassel has given to the government of the Khedive $300,000 for the establishment of traveling ophthalmic hospitals to alleviate these eye conditions. The organization of this hospital service has been entrusted to Dr. McCallan of London. As organized by him it consists of twelve tents. In the largest of these the surgeon performs his operations; in a second he lives; the others shelter his native assistants, the patients and the nurses. The cold in winter and the heat in summer sometimes makes the nomadic life uncomfortable, as in July when Dr. McCallan was obliged to abandon temporarily his traveling clinic and transport his patients to the government hospital at Damietta. As soon as the heat of the sun had moderated, he organized another traveling hospital, which he took to Lower Egypt. He then removed to the wonderful oasis of Medinet-el-Fayoum, where during the last year, 18,943 Egyptians came to this hospital for treatment. Other traveling hospitals are in preparation.

BACTERIOLOGY.

A most important addition to our knowledge of **Antitoxin Theraphy** is involved in the term *Opsonic Index.* Opsonins is a name given by A. E. Wright, says J. H. Smith,[1] to substances in the blood, which, acting upon bacteria, render these bacteria more palatable or attractive to the leucocyctes. They are a measure of the resistance of the organism to the bacteria in question, and their amount may be estimated. By an ingenious technique, the average number of bacteria taken up by a single leucocyte in normal plasma is determined, and similarly the average number taken up by one normal leucocyte in the presence of the patient's plasma instead of normal plasma. The

(1) The Ophthalmoscope, September, 1906.

quotient obtained by dividing the latter number by the former is the *opsonic index,* and it tells whether the resisting power of the patient is above or below normal. Opsonins are produced in the blood in response to stimulus. In the case of local bacterial infections, this stimulus is wanting, and it is supplied by injecting small doses of sterilized cultures of the particular bacterium. The result is a rise in the opsonic index, i. e., an increase in the resisting power of the patient. In the case of more generalized bacterial invasions, the stimulus is supplied from the main site of the disease by irregular invasions of the general system. In these cases the attempt is made to eliminate, so far as possible, these irregular invasions by rest and quiet and other means and to replace them by *regulated injections of sterilized cultures.* In every case, and most especially in the latter class of cases, the dosage in time and quantity must be regulated entirely by findings on repeated examinations of the index. For a most frequent result of an injection, or autoinfection, is a temporary fall in the resisting power. This fall varies in extent and duration, which can not be estimated by clinical symptoms or other means. If an injection is given during such a negative phase, the resistance will be still further lowered and irreparable damage may be done. The only guide to the injections is that of the index. The clinical results of the method have been most encouraging, including every kind of local infection where the bacteria can be opsonized.

[The desirability of combining vaccine therapy and passive hyperemia in the surgical treatment of infections is a subject exhaustively treated by John C. Hollister[1] of Chicago. In it the technic adopted by Wright is fully described and illustrated and the Editor strongly advises any of his readers interested in this form of treatment and its possible use in the conduct of eye infections to write Dr. Hollister for a reprint of his article. There seems no reason why the employment of "vaccines" for at least tubercular, streptococcus, staphylococcus and gonococcus invasions of the ocular apparatus should not be as useful as in infective disorders elsewhere.—Ed.]

(1) See Surgery, Gynecology and Obstetrics, p. 740, 1906.

Staining and Examination of the Bacteria of the Eye by Simple Methods. Loeffler's methylen blue continues to be our most useful stain, according to E. S. Thomson.[1] Carbol fuchsin, 5 per cent., may be used in the same way. For counterstaining, Wright's modification of Jenner's blood stain or Goldhorn's polychome methylene blue may be used. Decolorization is best accomplished by Gram's method. It is especially valuable in the differentiation of the gonococcus. The Koch-Weeks bacillus is best stained with Ziehl's solution of fuchsin. The Morax-Axenfeld diplobacillus is distinguished by cultural peculiarities. They stain well with ordinary aniline dyes and are decolorized by Gram. Animal experimentation, inoculation and careful study of cover-glass preparations, drops, smears and cultures may at times be necessary.

The bacteriologic results in his examination of a third series of one hundred cases of eye infection is recorded by Dorland Smith.[2] He gives the results of both smear and culture examinations and emphasizes the necessity of checking a smear by a culture examination and *vice versa*. In 70 cases of conjunctivitis, staphylococci, Koch-Weeks' bacillus and diplobacillus of Morax and Axenfeld were found in 34. The xerosis bacillus was found in 8. No organism in 12. Four doubtful and other germs in 12. In 9 cases of corneal infection, streptococci were found 3 times, staphylococcus pyocyaneus bacillus and mold once each and 3 indefinite. In 9 lacrimal cases the pneumococcus was found 3 times, the streptococcus 4 times. In lid infections the staphylococcus predominated. In 16 cases no organisms could be found to account for the infections.

The Diplobacillus of Morax-Axenfeld. The importance of this microörganism is emphasized by Pusey[3] as a danger to the cornea, while occasioning an annoying conjunctivitis. Its recognition is important, as we have in zinc a specific remedy. The lesion is generally a chronic blepharoconjunctivitis and the germ is pathogenic for the human eye only. It varies in size, but is usually about 1 micron wide and 2 microns long; the width is fairly constant.

(1) Jour. Amer. Med. Assoc., July 14, 1906.
(2) Arch. of Ophthalmology, July, 1906.
(3) Jour. Am. Med. Assocn., July 28, 1906.

When grown on Loeffler's blood serum there is much greater variation than when they are taken fresh from the conjunctiva. The bacilli usually occur in pairs, end on, whether found in secretion or culture, the ends of the bacilli being slightly rounded. Frequently pairs, dividing into four, as indicated by constrictions forming in the middle of each, are met with. Short chains are also found, particularly in cultures. The bacilli stain with all ordinary dyes and are negative to Gram. There is very little conjunctival secretion in a sac infected with this germ, but usually a deposit may be found on the caruncle. The diplobacillus can be grown only at blood temperature and on media containing human body fluids. The serum supplied by the city boards of health for diphtheria cultures is an excellent medium. This is liquefied in from sixteen to twenty-four hours, forming holes, the bases of which are moist and without color. After a while these holes become bigger and may coalesce. The bacillus of Petit is the only other germ which can be mistaken for that of Morax and Axenfeld. It liquefies gelatin and grows on all media.

Bacteriologic Researches in Infective Keratitis Due to the Bacillus Pyocyaneus. A patient, 44 years old, was struck in the left eye by a piece of wood. Three days later, when Bietti[1] saw the eye, there was a corneal ulcer with infiltrated margins and a yellow base. The loss of substance was great, measuring 5/6 mm. The ulcer did not occupy precisely the center of the cornea, but was located a little below and internally. The portion of cornea not involved by the ulcer was infiltrated. Cultures were made in peptonized agar, glycerin agar and blood serum. After fourteen hours there could be seen on all the culture media a growth of uniform green color. Petri dishes were inoculated and the same green colonies obtained. From these colonies cultures were made in milk, broth, gelatin and potato, and the *bacillus pyocyaneus* demonstrated. The virulence of the organism was tested by injecting a few drops of broth culture into the cornea of a rabbit without penetrating the anterior chamber. The next day an abscess, 3/4 mm., formed, followed by an ulcer. There was no hypopion.

The Bacteriology of Conjunctivitis. In an instructive

(1) Annali di Ottalmologia, Nos. 5-6, 1906.

article on this subject McKee[1] remarks that the work begun by Axenfeld, Uhthoff, Morax, Weeks and Gifford has borne such fruit that the old classification of conjunctivitis, according to clinical features, into catarrhal, purulent, membranous, granular, phlyctenular, with their subdivisions, is passing, and today the different forms are receiving their names according to pathologic and bacteriologic findings. While we are still unable to bring all cases of conjunctivitis under this classification, it enables us to divide conjunctivitis into two groups: 1. Conjunctivitis with no known bacteriologic cause, a conjunctivitis from foreign bodies, errors of refraction, trachoma, follicular conjunctivitis, spring catarrh.

2. Conjunctivitis with a definitely known bacteriologic cause, as blennorrhea from the gonococcus, streptococcus, pneumococcus, bacillus coli communis, conjunctivitis from Morax-Axenfeld's diplobacillus, Koch-Weeks bacillus, pneumococcus, bacillus of diphtheria, streptococcus, bacillus of influenza and pseudo-gonocccus.

The first part of a paper by Duane[2] discusses the *symptoms presented by the various bacteriologic types of conjunctivitis,* founded upon the careful examination of 132 cases of acute conjunctivitis. The conclusions arrived at as a result of the study of these cases are (verbatim) as follows: 1. There is no special type of conjunctivitis associated with any special germ. The clinical picture, therefore, affords no clew to the germ causing the conjunctivitis.

2. While certain organisms, like the gonococcus, diphtheria bacillus and streptococcus, usually cause severe reaction, and the other germs regularly produce much slighter effects, this rule has many exceptions, and no sure deductions can be drawn from the intensity of the inflammation as to the germ causing it.

3. Membranous conjunctivitis, as is well known, may be caused by a variety of organisms. It does not necessarily indicate a severe inflammation, nor one that will always produce other evidences of excessive reaction besides the false membrane.

4. In trachoma, particularly trachoma in the stage of acute exacerbation, a variety of organisms may be present.

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(1) Amer. Jour. Med. Sc., June, 1906.
(2) N. Y. Med. Jour., May 26, 1906.

These do not, of course, cause the trachoma, but they are of importance in that they do produce an intercurrent acute conjunctivitis with secretion, which latter serves as a carrier of contagions and thus disseminates not only the conjunctivitis, but the trachoma as well.

5. The staphylococcus albus, and particularly the staphylococcus aureus, when occurring in the conjunctival sac, are sometimes at least pathogenic, and distinctly predispose to the production of corneal lesions. The fact that the staphylococcus albus is probably an almost constant inhabitant of the conjunctival sac does not invalidate this conclusion.

Very mixed infections seem, if anything, to be rather less severe than those in which one germ is the predominant infecting agent.

In presenting these conclusions Duane says that he does not attach too much importance to the bacteriologic findings, and that the latter are often uncertain and negative; that staphylococci, when found in old cases, particularly in the corneal lesions, represent not the primary infecting germ, but a secondary invasion, so that they are to be regarded not as the cause of the lesion, but simply as a complication of it or as a mere contamination; and, finally, that deductions as to the action of the pathogenic germs must reckon not only with the kind of germ present, and with its amount, but also with its varying pathogenicity.

Filaria Loa. Entozoa affecting the human eyes are rarely encountered in America. Vail[1] reports the second case in which the *filaria loa* was extracted within the confines of the United States. The patient had become affected while residing in Africa in 1899; a number of worms were extracted from beneath the skin of the eyelids and other parts of the body during the stay of the patient in Africa. In August, 1901, the writer's examination failed to reveal the existence of any parasite; but in June, 1903, the patient returned and stated that he felt these "eye worms" at times in the eyelids, again in the eyeball and frequently about the ankles, ribs and wrists. In September, 1903, the writer saw "a distinct, independent movement, like what would be made by a small worm an inch long, crawling about under the skin of the upper

(1) Amer. Jour. of Ophthal., December, 1905.

eyelid. The movements were slow and somewhat clonic. During one of these extractions he grasped the most prominent loop of the worm by means of fixation forceps, and then by means of scissors and forceps succeeded in extracting the worm without its being severed or wounded." At the present time, two years and eight months since the patient left Africa, these worms are as active as ever, four being felt at various times, limiting their peregrinations to the extremities and especially the tissues about the eyes, especially on chilly days out of season and cold days following a warm spell, and without interference with the general health.

[A complete account of this remarkable entozoon is also given by Ward, of the University of Nebraska.—Ed.]

Rochat[1] was consulted by a man whom he had previously treated for hordeola and whose eyes were normal. He now complained that his eyes itched and watered. Before the looking glass he had noticed in the white of the eye a "small nerve which moved." On looking strongly downward and after lifting of the upper eyelid, near the upper fornix, a transparent thread was seen, with slow tortuous movements. It was removed with a pair of forceps through an opening in the conjunctiva and proved to be a *filaria loa*. Patient had returned from the Congo three years before without noticing any abnormal symptom; his blood was free of embryos, the urine normal (he had hematuria in the Congo); no other specimens have since shown themselves.

EYELIDS.

Occasionally one is consulted on account of the **Premature Whitening of the Cilia.** A man, aged 18, who had been under Vogt's[1] treatment for iridocyclitis of both eyes for nine weeks (the affection had commenced five weeks previously) showed a marked white discoloration of almost symmetrical tufts of the cilia of both upper lids, the lids and glands being normal. Some of the white cilia were full grown, others short and showed white apices on pigmented bases. The poliosis progressed within the following three

(1) Tydsch. v. Geneesk., Feb. 24, 1906.
(2) Klin. Monatsbl. f. Augenheilk., p. 228, 1906.

weeks. No cause could be found, but an indirect one in the iridocyclitis.

A review of the incident literature shows a connection of *poliosis of the cilia* with severe iridocyclitis, especially sympathetic, in 39 per cent. with migraine in 11 per cent., with "cold" in 5 per cent., with no complicating disease in 39 per cent. Vogt studied in his patient the development of the white and pigmented cilia by epilating a portion of them and by cutting another portion close to the skin. Some of the latter, which apparently were full grown, did not return, others sprouted rapidly, *i. e.*, were young cilia which had not been reached by the scissors. The clipped gray cilia retained their discoloration in growing, and those reappearing in the places of the epilated gray cilia were without pigment. However, they came more slowly and were thinner than the pigmented ones.

Vogt concludes that the premature poliosis of the cilia depends upon the lack of pigment supply from the papilla. It is a gradual, not a sudden process, but the "trophic" disturbance may be due to neurotic or circulatory anomalies.

The Pathology of Trachoma. The anatomic basis of trachomatous affections, according to Goldzieher,[1] is a lymphoid granulation, which at the beginning is confined only to the upper layers, but later on involves the whole conjunctiva and leads to the formation of scars.

As regards the etiology, the author does not consider blennorrhea and trachoma identical, although there are some forms of chronic blennorrhea that can not be differentiated from trachoma with papillary hypertrophy. On the other hand, the form of trachoma with gelatinous infiltration of the conjunctiva and the tarsus, where the secretion is very slight, is totally different from the clinical picture of chronic blennorrhea.

The clinical importance of the follicles is overestimated. The Germans call this disease "follicular affection" of the conjunctiva, in spite of the fact that there are numerous cases where trachoma exists for a long time without follicles. There are, however, follicular catarrhs of quite different etiologic nature, which disappear without the formation of any scars and without treatment, thus prov-

(1) Wien. med. Wochenschr., March 30, 1906.

ing that the follicles have no pathognomonic significance for trachoma. According to the author pannus originates in small marginal infiltrations, to which a network of vessels leads from the limbus; these infiltrations in the course of time progress more and more till they begin to ulcerate.

Treatment of Trachoma. The following treatment of trachoma is original, so far as he knows, with J. A. Pratt[1] of Aurora, Ill. The eye and lids are cocainized; then the everted lids are thoroughly massaged with boric-acid powder. The massage pressure is made with a cotton wound probe. There is extensive hemorrhage at the first treatment, which grows less as the granulations decrease. The massage ruptures many of the granulations and fills them with powder. The partially dissolved powder is allowed to remain under the lids and the eye bandaged, or cold applications made. After three days the treatment is repeated. After the first four treatments, three days apart, it is decreased to once a week. Improvement is rapid, and there is very little scarring.

The Surgical Treatment of Trachoma is discussed by Ryerson.[2] He prefers Darier's "grattage." Under general anesthesia, the lower lid is everted by special forceps and scarification made with a three-bladed knife, so as to divide every granulation. If the lids cannot be completely everted, he divides the outer angles. If the caruncle is also infected it is removed with scissors. The scarifications cause the gelatinous material to escape, and care must be taken not to allow it to remain in the wound. The conjunctival surface is thoroughly scrubbed with a hard toothbrush moistened with a 1-1500 solution of cyanid of mercury. The reaction is marked, but may be controlled by iced boric acid or acetate of lead compresses.

The successful use of grattage is dependent upon proper choice of the case, the best result being obtained in the severer forms of papillary granulations, though the sago grain form is also benefited. In old atrophic trachoma it is useless. The treatment must be thorough and not leave a single granulation to act as a center for reinfection. The operation should be followed by careful medication.

(1) Ophthalmic Record, January, 1906.
(2) Annals of Ophthalmology, October, 1906.

In his treatment of trachoma Imre[1] is influenced by the amount of the inflammation and secretion, the state of the follicles, the papillary hypertrophy, the thickening and degeneration of the tarsus and the sequelæ (trichiasis, etc.). Of the chemical remedies, lapis divinus [a fused mixture of cupric sulphate, alum and camphor.—Ed.] and copper are still much in use; they relieve the infiltration of the mucosa and contract the blood vessels, act as disinfectants and diminish secretion, but, on the other hand, they hasten the formation of scars and cause trachomatous follicules to become harder. This result is not desirable, because the conjunctiva becomes thicker, more uneven, and a cure becomes impossible. The ideal treatment for these follicules and infiltrated plicæ is the mechanical one. In the course of this mechanical treatment it is desirable that as little injury and irritation be done as possible. The soft granules it is possible to express with the roller forceps, but the author is more in favor of an *abrasion of the granules,* as this procedure causes less injury to the mucosa. Galvanocautery should be employed only when the affection is extensive. Excision of the fornix is rarely necessary. Excision of the tarsus is quite efficient.

[In very chronic, obstinate cases in which the submucous tissues—especially the tarsus—are involved the Editor strongly advises the last named surgical procedure. He has operated on nearly 50 cases with marked success.]

Plastic Operation on the Eyelids by Means of Skin Flaps Taken from the Neck. A plastic operation for relief of a marked cicatricial ectropion of both upper and lower lids, resulting from a burn, and which had previously been unsuccessfully operated on by the transplantation of Thiersch grafts, is described by Snydacker.[2]

He made incisions parallel to the borders of both lids, dissected adhesions, and put the lids on the stretch by suturing the upper and lower lids together. A large skin flap was then cut from below the angle of the lower jaw to the clavicle, the pedicle of the flap being at the angle of the jaw, and the lower end of this flap was split upwards 4 cm., the flap turned on its pedicle, and one end of the split flap sutured on the denuded area of the upper lid and the

(1) Wien. med. Wochenschr., March 3, 1906.
(2) Archives of Ophthal., January, 1906.

other split and over the lower lid. A bridge of flap was thus left extending from the outer edge of the eyelids to the pedicle of the main flap at the angle of the jaw. The bridge of skin passing over the cheek was allowed to remain for six days and then cut off. The wound in the neck was covered by undermining the edges, bringing them together and suturing.

Two Cases of Plastic Lid Building. A woman who had suffered for two years from syphilitic ulceration of the face lost both lids of her right eye from the disease. The eye was without protection, the cornea vascular and eroded, a purulent discharge came from the exposed conjunctiva. Vision reduced to light perception. An upper lid was formed by C. H. Baker,[1] who made a horseshoe-shaped incision from canthus to canthus with its highest point an inch and a half up on the forehead. The flap thus created was dissected down to its attachment to the conjunctiva. It was then slid down over the eye and anchored below the eye with two sutures. The upper edge of the flap was stitched to the fibrous tissue below the orbital ridge, so that contraction from above would not draw the flap up. The exposed area above was covered with skin grafts. The result was that a lid was made which about half covered the cornea. The same operation, only reversed, was performed below to form a lower lid. The cosmetic result was good, and the cornea became free from vascularity and healed, but the eye had but little vision. For a year the eye did well and then the conjunctiva became reinfected and discharge was again profuse. The cornea ulcerated and the patient suffered so much pain that enucleation was finally performed. The second case was that of a man who had a malignant growth of the eyelid, demanding that the temporal half of the upper lid be removed. This defect was corrected by a pedicle flap from the temple which healed nicely in position, giving a good cosmetic result. This operation was performed ten years ago. There has been no recurrence of the angiosarcoma.

The author reports a satisfactory result.

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(1) Ophthalmic Record, April, 1906.

The Galvano-Cautery in the Correction of Entropion. For many years Tornatola[1] has done the first part of the operation with the galvano cautery, destroying as much of soft tissue of the lid and tarsus (a wedge-shaped piece) as is removed with the bistoury in Streatfield's method. Union of the soft parts follows after removal of the eschar and the tarsus with correction of the curvature of the lid. It is rare that one has to insert sutures to bring together lips of the wound. The operation is performed with great rapidity, provokes little pain, is followed by cure and leaves no deformity.

On Widening of the Palpebral Fissure with Thiersch Grafts. In chronic infiltration of the conjunctiva and in shrunken conjunctival sacs von Ammon's canthoplasty does not prove efficient, on account of the lack of elasticity of the conjunctiva, which prevents a sufficient covering of the wound, or the fixating sutures cut through too early. Kuhnt[2] accordingly covers the wound with Thiersch's flaps taken from the inner side of the upper arm. The flap must be large enough not only to cover the incision, but also to be inserted 3 to 4 mm. under the undermined edges of the skin and conjunctiva.

Three Cases of Angioneurotic Edema (Disease of Quincke). The first case was a woman, 45 years old, who experienced, one night, a swelling of the left eye with no pain. She was unable to open the eye. She attributed the trouble to sleeping in a draught. There was a true edema of the lids and conjunctiva. The skin of the lids was distended without any alteration of color or a solution of continuity. The conjunctiva showed no wound or foreign body or pain or irritative phenomena. Vision was normal. The patient suffered from irregular menstruation and had from time to time an inflammation of the hands and knees, which left a pruritus. The edema promptly disappeared with the use of astringent applications and purges.

The second case, at the age of 15 years, following exposure to cold, was taken at night, with swelling of the O. D. and at the same time loss of voice without pain. The edema involved the lids and conjunctiva of the inferior

(1) Annali di Ottalmologia, No. 11-12, 1905.
(2) Zeitschr. f. Augenheilk., p. 238, 1906.

cul-de-sac. There was no alteration in color, no sign of irritation and no pain. Purges and astringent applications were prescribed and the next day the edema had disappeared. One month later the attack was repeated. At this time a throat specialist found edema of the vocal cords, which disappeared in twenty-four hours. For some time the attacks recurred at intervals of four or five days. The third case was a woman, anemic and constipated. For five or six years she had been subject to transient edema of the face, which appeared with her menstrual periods and lasted usually twelve to twenty-four hours. Both lids were edematous. Mazza[1] believes all these cases should come under the head of Quincke's disease.

THE CONJUNCTIVA.

Vernal Conjunctivitis. As we have passed the spring equinox it is well to bear in mind the probability that most of us will soon have a case or two of this obstinate disease on our hands. Remembering Posey's work on this subject and the results of *treatment of several cases with the X-rays* by Frank Allport the Editor has been able to assure the parents of a child who came to him recently exhibiting a four-year-old example of the palpebral variety that the small patient can be cured before June. In this case the "blocks" of heaped up epithelial and connective tissue that completely covered the tarsal region were entirely removed under a general anesthetic and the Roentgen ray employed as directed by Allport. Already the itching, foreign body sensations, lacrimation, etc., as well as the local signs are markedly ameliorated. Next autumn the Editor hopes to report the results of the treatment as regards one summer.

Parinaud's Conjunctivitis. A case in a man, aged 52, ran a very protracted course, with intense mucopurulent secretion which most likely was the cause of the involvement of the cornea. Since the exuberances did not abate after three months, Bernheimer,[1] fearing a further deleterious influence on the cornea, made a complete excision

(1) Annali di Ottalmologia, Nos. 5, 6, 1906.
(2) Klin. Monatsbl. f. Augenheilk., p. 323, 1906.

of the affected conjunctiva with the tarsus of the upper lid. The patient left, after five months' stay in the clinic, cured, but with opacities of the cornea. The anatomical examination decidedly excluded trachoma and tuberculosis, amyloid, folliculosis of the conjunctiva, and the inoculations on rabbits were negative.

According to Bernheimer's examinations, Parinaud's conjunctivitis is characterized by most intense infiltrations of the conjunctiva with lymphoids and phagocytes, swelling and proliferation of the endothelium of the abundantly developed blood vessels, leading to complete closure of their lumen. New formed tracts of connective tissue pervade the exuberating tissue, and a marked necrosis of the tissue cells occurs in foci. But even after duration of the most severe forms of infiltration of the conjunctiva the tarsus remains permanently unaltered.

Bernheimer, however, gives no clue to the etiology of the disease.

Morax-Axenfeld Conjunctivitis. This disease is described by Tooke[1] as a subacute or chronic inflammation of the palpebral conjunctiva and adjacent skin margins, especially the inner angle of the palpebral aperture. It is attended with secretion which dries on the lid margins and gums the lids together upon arising and is accompanied with burning, feeling of sand in and a desire to rub the eyes. Both eyes are sooner or later affected. The appearances are that of a low grade of conjunctival inflammation with swelling of the conjunctiva and the lid margins, especially about the inner canthi and caruncle. Corneal complications are comparatively rare. Microscopically the diplobacilli are usually seen in pairs or in short chains. If they are enveloped in a capsule it is very indistinct. They grow on blood serum at blood heat, but do not grow on agar. The only bacilli with which they may be confused are Friedländer's pneumonia bacilli and the so-called oezena bacilli and the bacillus liquefaciens of Petit. The former grow on agar and have a well-marked capsule; the latter grows equally well on agar or serum and readily attacks the cornea and is considered by Paul and McNab to be a sport of the

(1) Ophthalmic Record, May, 1906.

diplobacillus of Morax-Axenfeld and that it is more virulent. Zinc sulphate in from 0.25 per cent. to 1 per cent. solutions acts as a specific. The pathology of the lids is shown by the microscope by the squamous epithelium of the lids extending as far as the margins. Numerous epithelial sacules are seen dipping into the deeper structures. The squamous epithelium covering the skin of the lid margin is distinctly thin, the outer horny layer being practically absent. The columnar epithelium of the palpebral conjunctiva does not consist, as in the normal, of two, but of from four to six layers. Leucocytes are found among these cells in varying numbers, and the deeper structures show increased cell activity. Statistics show from 14 to 17 per cent. of this disease in all kinds of conjunctivitis, except trachoma, for English-speaking countries.

J. J. Thompson[1] reports the case of a female, act. 24, who exhibited a **Primary Tuberculosis of the Conjunctiva.** She applied for treatment because of swelling of the preauricular gland and a peculiar feeling in the right eye of a few weeks' duration. There was found, upon everting the upper lid, an ulcer of 2 mm. in diameter situated at about the center of the tarsal conjunctiva. Its edges were clear cut and its base was clean, very slight induration surrounding it. Later a very small ulcer made its appearance 1 mm. from the original one. No family or personal history of tuberculosis could be obtained. Physical examination was negative. Scrapings from the ulcer failed to show tubercle bacilli. An injection was made into the peritoneum of a guinea-pig. This animal finally died of general tuberculosis. The preauricular gland continued to enlarge and was enucleated. Examination of it showed several typical anatomical tubercles, with a fair number of giant cells. The ulcer was now attacked by removing it with the surrounding tissue. The usual regimen for tubercular patients ordered. The ulcer healed in two weeks. No recurrence of the ulcer or glandular swelling. The author believes that the lid ulcer was due to local infection and not to any deposit carried by the blood stream.

(1) Annals of Ophthal., January, 1906.

Septic Infection Following Ophthalmia Neonatorum. Infection of the whole organism from local toxins is more common in the case of the eye than is generally supposed. Stephenson[1] reports a curious example of general sepsis following probable gonorrhœal ophthalmia. It was a case of antepartum ophthalmia in which the gonococci could not be found. Both cornea perforated. One month after birth the child developed multiple abscesses, one on the foot, the arm and the hand. They were opened but no gonococci found. At no time did the temperature go above normal. The child recovered.

Blennorrhea Neonatorum From the Bacillus Coli Communis. A case of severe purulent conjunctivitis due to the colon bacillus is reported by Hanford McKee.[2] The child was four days old, and the eye had become inflamed and began discharging the day before. The clinical picture presented severe swelling of the lids with profuse virulent discharge, edema of the bulbar conjunctiva, blennorrhea neonatorum. The cornea was intact. The left eye was not involved, so was immediately protected. Smears were made and media inoculated. The stained slide showed a few Gram positive bacilli — the xerosis — and numerous Gram negative bacillus which looked like the colon bacillus. The gonococcus was not present.

The author ordered irrigation of the conjunctival sac every half hour with warm boracic solution. The discharge gradually ceased, and on the fifth day the eye was quite well. The cultures showed growths of the bacillus coli communis with a few colonies of the xerosis bacillus.

The case is of interest, says the author, inasmuch as the infection was caused by the bacillus coli communis, but gave the clinical picture of the blennorrhea set up by the gonococcus. Axenfeld reported a case in 1896, and later Bult. They both emphasize the fact that blennorrhea from the colon bacillus runs a much milder course than that caused by the gonococcus.

Vaccine Infection of the Conjunctiva. The case reported by Jacqueau[3] was in a woman, 30 years of age,

(1) Ophthalmic Record, September, 1906.
(2) Montreal Med. Jour., October, 1906.
(3) La Clinique Ophtal., June 10, 1906.

who for a long time had had a few slight lesions of the lid margins which had never been cured. Jacqueau saw the case three days after active symptoms appeared. The left eye was involved and there was swelling of the lids and an enormous chemosis and great pain. The preauricular ganglia of same side and the submaxillary ganglion were enlarged and painful. The lids were swollen and of a pale yellow. On the palpebral conjunctiva were two small whitish yellow plaques of a pseudomembranous aspect. There were two small ulcerations of the lower lid. The pupil reacted well and the eye fundus was normal. General condition good and no hyperthermia. Patient denied any source of contagion; she, however, had the care of an infant which had been vaccinated and which had had, eight days previously, well-marked pustules. A bacteriologic examination with cultures was made with absolutely negative results. The case, under the circumstances was, therefore, believed, from its clinical history throughout, to be one of vaccine infection through the former lesions of the eyelids. The active symptoms disappeared in a few days and the eye was restored to normal condition.

THE CORNEA.

Clefts in Descemet's Membrane. These clefts have been observed, according to Stephenson,[1] in buphthalmos, keratoconus, intraocular tumors and in progressive myopia. The clefts are evidenced by curious curved lines lying at the posterior surface of the cornea. Two cases are reported, one in a woman of 21 years with myopia of about 12 D., and the other in a child of 6 months with buphthalmos.

[The Editor[2] recently reported (see Plate I) a similar case of clefts in Descemet's membrane due to, or associated with a high degree of myopia. This lesion seems to result from mechanical stretching of the endothelium and inasmuch as the cornea reaches its full growth and powers of resistance early in life these linear ruptures are usually congenital or occur during infancy.]

(1) The Ophthalmoscope, June, 1906.
(2) Ophthalmic Record, December, 1906.

Triangular Opacity in the Superficial Layers of the Cornea Occurring in Syphilitic Subjects. A lad of 17 years with congenital syphilis, suffering from interstitial keratitis, developed in one eye a superficial triangular opacity of the cornea, extending from its base to its center. This opacity seemingly was made up of thickened epithelial and subepithelial elements. It had a glistening white appearance and was slightly raised above the surrounding tissues and had sharp lines of demarcation. The eye was under observation by Posey[1] for nine years and the opacity underwent no change. His second case was that of a colored woman, aged 32 years, with acquired syphilis in the late secondary or early tertiary period. One cornea presented an opacity very similar in appearance, size and position to that of the boy above described. The tension was +1. There were evidences of excavation of the nerve head and of uveitis. This case has not been observed long enough to determine the influence of treatment.

Corneal Opacities Following Resolution of Keratitis Disciformis. This form of keratitis must be differentiated, according to Scheffels,[2] from the keratitis profunda of Arlt and the keratitis annularis of Vossius, both of which are types of keratitis parenchynatosa, in which there are very many discrete foci collected into a group showing no sharply defined outer boundary. Keratitis disciformis (Fuchs), on the contrary, consists of a single circumscribed area with sharply defined margin, which probably spread from a single point at which the inflammatory bacteria entered the corneal tissue and from which the infiltration spread in a circular manner. Clinically it occupies a position between ulcus serpens and the shallow disciform ulceration of herpes cornea. Shirmer and v. Hippel, Jr., agree with Fuchs in considering it of endogenous origin, due to injury of the corneal epithelium. In opposition to this Peters believes the essential process to be a nerve lesion of the affected area of the cornea, and further believes that no difference exists between this and the herpetiform disease, and that only exceptionally is the opaque disc the expression of an infection or an

(1) Ophthalmic Record, February, 1906.
(2) Die Ophthalm. Klinik., uJne 22, 1906.

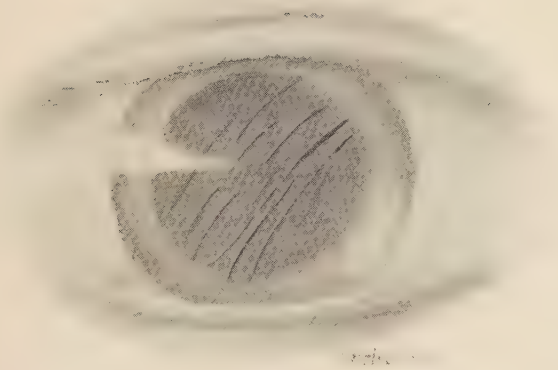


PLATE I.

Casey Wood's case of Clefts in Descemet's membrane accompanying a high degree of myopia. (Page 39.)

Posey's case of triangular opacity of the cornea.

Posey's case of triangular opacity of the cornea. (Page 40.)

PLATE II.

abscess, it being usually due to disturbance of nutrition, brought about by the nerve lesion.

Scheffels records a case which he says confirms in detail the description of keratitis disciformis as given by Fuchs. As the result of a coaldust injury to the eye, received in February, 1902, a severe corneal affection resulted. It was looked upon by an examiner as a spontaneous parenchymatous keratitis and no damages were allowed. Ten months later a second examiner found in the substantia propria, which was superficially dull and stippled, extremely numerous fine, cloudy opacities, which lay principally in the deeper layers of the membrane, and which, especially downward, extended in narrow, lengthy opaque striæ, sharply defined from the clear portions of the cornea. There was marked anesthesia of the cornea. At the present time the opacity is in the deeper layers of the cornea, and especially below is the saturated margin of the disc visible, and, as described by Fuchs, there are in places twofold and in other places threefold incomplete concentric rings. The saturation of the marginal opacity diminishes toward the center of the disc quite gradually, but quite abruptly, outwardly toward the clear cornea. In some places in the rim of the opacity there are radiating and crossed opaque streaks, which lie still deeper and are doubtless dependent upon folding of the membrane of Descemet.

The Treatment of Corneal Opacities by Chlorid of Ammonium. For about three years Pick[1] has used with good results in old opacities of the cornea solutions of chlorid of ammonium *for clearing opacities of the cornea caused by lime.* In a case, e. g., of a central scrofulous opacity of six years' standing in a girl, aged 18, V. rose from 1/x to 1/iv. One to three teaspoonfuls of the mercantile sal ammoniac water are dissolved in a cup of boiled tepid water, and with this applications are made on the eye for twenty minutes three or four times a day.

Serotherapy in Infectious Ulcers of the Cornea. Serotherapy, Darier[2] states, has given such marvelous results in ocular diphtheria, that one is encouraged to try it in the treatment of infectious ulcers of the cornea. The

(1) Centralbl. f. Augenheilk., p. 176, 1906.
(2) La Clinique Opthalmologique, Oct. 10, 1906.

physiologic processes of the organism show us the rôle played by cells and fluids in resisting noxious matter of all kinds. Ehrlich and Roemer have proved experimentally, in their efforts of immunization against jequiritol, the power of these cells and fluids. Lastly, Roemer has sought to apply to the treatment of infectious corneal ulcers a serum therapy which, in his hands, has already given results which are very encouraging. We know that serpiginous ulcer of the cornea or simple ulcer with hypopion to be ocular lesions of great gravity. Roemer gives us hope that an infectious ulcer of the cornea, if taken in time, will immediately be arrested by one injection of antipneumococcus serum—a treatment that is absolutely inoffensive and painless.

From the researches of Uhthoff and of Axenfeld we know that the infectious corneal ulcer has for its cause the pneumococcus of Fraenkel-Weichselbaum, and that it is found not only in the conjunctival sac, but also in the pharynx and nasal fossa. An antipneumococcus serum has been prepared by Pane in Italy, and the brothers Klemperer have brought about a number of pneumococcus immunizations; but it is not known whether this immunity results from a toxic effect or from an increased resistance of the cells or from the power of a specific substance which attacks the bacterial vitality. Darier believes it definitely established, since the research of Roemer, that the pneumococcus immunity is produced by antibodies which have a specific bacteriolytic action.

Roemer demonstrated that by means of a powerful antipneumococcic serum rabbits can be absolutely immunized against the pneumococcus. And, further, in these immunized rabbits, he has not been able to produce the least inflammatory reaction in the rabbit's cornea. It is true that the serpiginous ulcer can not be produced in the rabbit; but in apes, which are liable as are men to corneal suppurations, Roemer was able to bring about an immune condition, absolutely refractory to pneumococcic infection of the cornea.

Darier tried the antidiphtheritic serum of Roux in a case of grave corneal ulcer consecutive to purulent ophthalmia. The cure was rapid and complete, so much so

that Darier's pupil, Dalnoy, tried the same remedy serum in two similar cases, with a cure rapidly following.

The author also details a case of a large corneal ulcer with hypopion, the result of trauma, and, after various local antiseptics, galvanocautery applications, etc., without success, 10 c. c. of the Roux serum was injected in the patient's thigh with marked amelioration on the following day, when a second of 10 c. c. was given. Cicatrization was complete in fifteen days. Darier has had in several instances the same result in similar cases from this serum.

Herpes Zoster Opththalmicus. Six cases of *ocular shingles* are described in detail by Stieren.[1] He divides these painful forms of neuritis into minimum and maximum categories, according to the severity of the symptoms and the character of their sequelæ. He believes that they generally result from exposure to cold or dampness in individuals of sedentary habits who have recently undergone some unusual exertion.

A Successful Operation for Conical Cornea. A girl, aged 21, with conical cornea, developed an ulcer at the apex of the worse conus which threatened to perforate. Bader's operation was modified by Stauffer[2] to meet the exigencies of the case. Two curved needles were placed in a vertical manner through the apex of the cornea, going in below and emerging above the ulcer. The cornea was transfixed in the horizontal meridian with a Graefe knife and made to cut out below. The flap thus made was excised above with scissors, and the sutures pulled home and tied. The wound was found closed at the end of twenty-four hours, and in twelve days was firmly united. A faint linear scar was left with vision of 6/36 with proper lenses. A difference remained of 16 diopters in the two principal meridians.

A Simple Operation for Staphyloma of the Cornea. An excellent result in a case of leucomatous staphyloma of the cornea in a child, aged 9 months, was obtained by Wicherkiewicz.[3] The staphyloma was punctured with a Bowman's needle and the aqueous emptied in a stream.

(1) Ophthalmic Record, February, 1906.
(2) Ibid., May, 1906.
(3) Klin. Monatsbl. f. Augenheilk., p. 32, 1906.

The staphyloma, collapsed in folds, was grasped with forceps, and an oval piece, almost of the width of the cornea and 4 to 6 mm. high, was cut off with scissors. The wound edges were accurately adapted and healed without sutures. Tension became normal and three months later the eye had the same size as its fellow.

DISEASES OF THE LENS. CATARACT.

The Nature of the Degenerative Alterations in the Crystalline Fibers. Trufesco[1] has applied to the study of these degenerative processes the different methods of histochemical analysis. Though the older authors, who studied the pathology of cataract, rarely made use of solvents, they were much impressed with the presence of fat globules in the crystalline mass. In more recent works, while it is no longer a question of fatty degeneration, solvents are not mentioned in the examination.

Mlle. Trufesco reaches the following conclusions from her researches: 1. In senile cataract there is a fatty degeneration of the crystalline fibers. The globules of fat are found in the interior of the fibers in the commencement; later, the fibers are separated into fibrillæ which disappear, and in the advanced stage there is simply a homogeneous mass interspersed with vacuoles.

2. These vacuoles represent the spaces occupied by the fatty globules and do not appear until these globules have been dissolved by the reagents used.

3. The masses of granulations in the spaces between the separated fibers appear to be only fat globules.

4. Fatty degeneration of the crystalline fibers is observed particularly toward the equator of the lens.

5. As to the nature of this fat, from the histochemical and optical researches, it seems to result that there are several varieties of fat in the degenerated crystalline fibers. Abundant crystals of cholesterine which could be isolated and made to recrystallize were found.

Some Forms of Hereditary Cataract. Three families with hereditary cataract are described by Casey Wood.[1]

(1) Annales d'Oculistique, April, 1906.
(2) Ophthalmic Record, April, 1906.

The report is accompanied by diagrams of the family trees. The Carlton series: There are four generations, represented by thirty-one individuals, of whom eleven have had cataract, almost all of the presenile variety. The Hussa family was traced for five generations in an incomplete manner. Twenty-five members of this family are reported upon, twelve of whom had juvenile cataract. In two the cataracts were operated upon with success. The Ira Smith family consists of nineteen members, represented by four generations; six had cataract. Evidences of lenticular opacity were noticed in each case at about

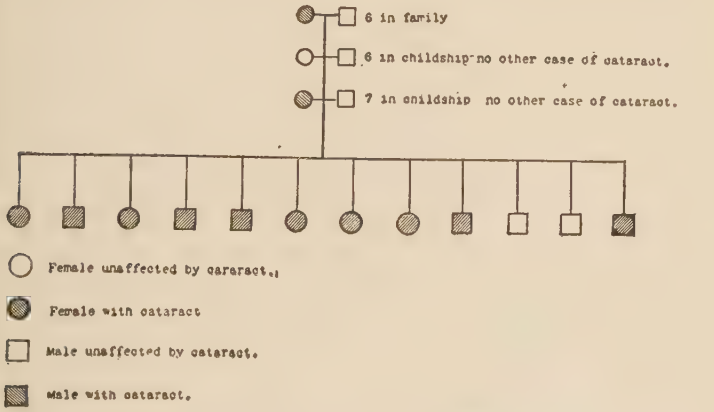
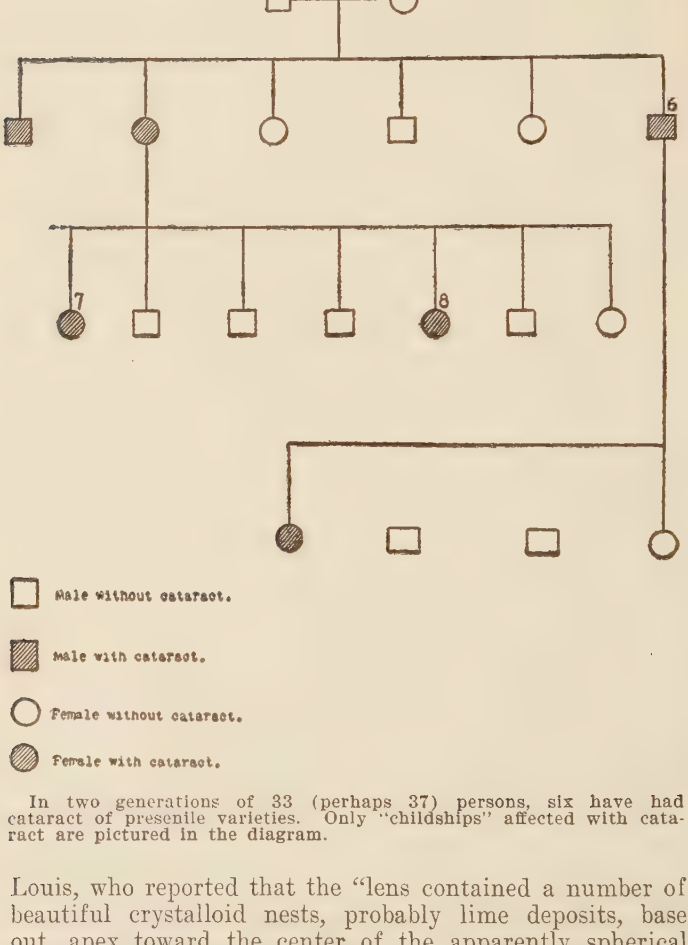

6 in family
6 in childship-no other case of cataract.
7 in childship no other case of cataract.
Female unaffected by cararact.
Female with cataract
Male unaffected by cataract.
Male with cataract.

Fig. 2. Casey Wood's Case of Hereditary Cataract.
Counting only those Siblings, one or more of whose members were affected by cataract, we have in this instance about 31 individuals (four generations), of which number *twelve* had cataract, mostly of the presenile variety and some of them certainly lamellar.

the age of puberty, but no very great trouble was experienced until late in life. Five of the six patients were operated upon after the age of 60. With one exception these operations were failures, the blindness setting in from glaucoma without apparent infection and after the primary wound had healed. In every case the cataract was removed by a competent surgeon, who very well knew the peculiarities of the family and took every precaution possible to prevent disaster. In one case operated upon by Wood the lens was sent to Adolph Alt, of St.

Fig. 3. Casey Wood's Case of Hereditary Cataract.



In two generations of 33 (perhaps 37) persons, six have had cataract of presenile varieties. Only "childships" affected with cataract are pictured in the diagram.

Louis, who reported that the "lens contained a number of beautiful crystalloid nests, probably lime deposits, base out, apex toward the center of the apparently spherical cavity."

[The foregoing may be regarded as a small contribution to the important extensive researches of Nettleship on the same subject.—Ed.]

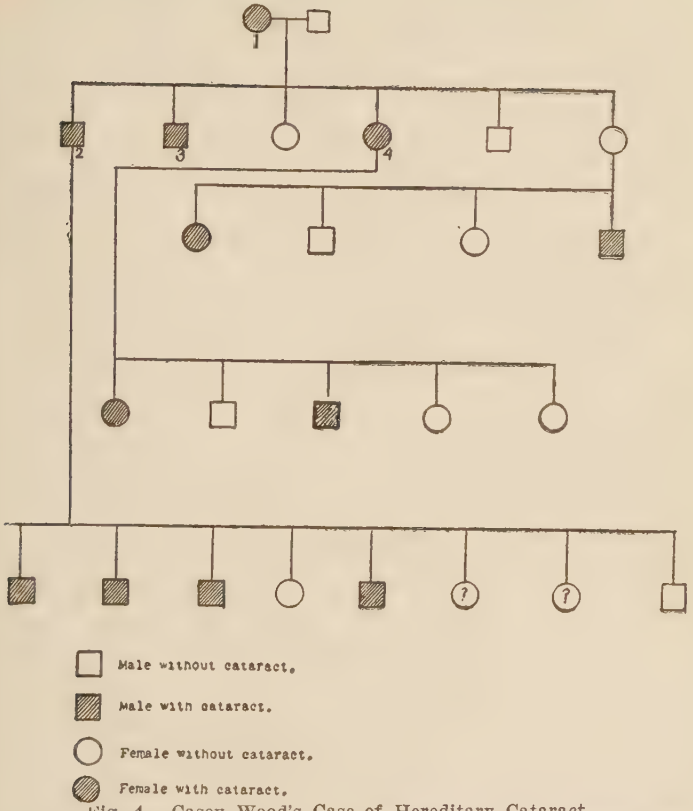


Fig. 4. Casey Wood's Case of Hereditary Cataract.
In three generations (of 44 to 48 individuals) 12, and perhaps 14, had cataract, all the juvenile type. Only "childships" affected by cataract are pictured in this diagram.

Cataract Caused by a Discharge of Industrial Electricity. A male, aged 35, received a shock from a direct current of 500 volts. A short circuit occurred from holding an end of the cable in each hand. Muscular contraction of his arms caused him to receive most of the burn on the left side of his face. He was blinded by the flash, but an hour after his vision was 20/40. The right eye, when examined by Ellett,[1] presented marked conjunc-

(1) Ophthalmic Record, January, 1906.

tivitis, with iridic congestion. In a few days the eye was free from congestion, with vision 20/20. Three months later he returned with O. D. V.=20/200. Pericorneal injection and discolored iris. Pupil dilated with atropin and numerous small white dots observed in the lens beneath the capsule. No sugar in urine. In a few days the eye was white. In twenty days the lens was almost opaque and two months later it was entirely opaque.

Some Points in Extraction of Cataract. Lightness and delicacy of touch are considered by Marshall[1] to be essential in a good operator. He has not had the courage to attempt extraction of the lens in its capsule. Preliminary iridectomy is considered, as a rule, superfluous. A patient must have a cataract in both eyes before he should be advised to extract it in one, traumatic cataract excepted. He does not believe in extracting in one eye until the vision of the fellow eye is so lowered as to demand it. He makes a large incision with a conjunctival flap, and passes the point of the knife through the anterior capsule during the excursion of the knife through the anterior chamber. The two principal advantages of performing capsulotomy in this way are that there is never anything in the anterior chamber, such as blood, to obscure the view. Thus capsulotomy is assured, and it is certain that the point of the knife is sharp, while with a capsulotome one is never so sure of this. He prefers simple extraction, and does not do an iridectomy unless, after the extraction of the lens, the iris does not go back into position.

Preliminary Iridectomy in the Operation of Cataract. For the past two years Bérard[2] employed preliminary iridectomy in the majority of his cataract cases, and claims for it the following advantages: 1. Shorter duration of the intervention. 2. Absence of the painful period attendant on the section of the iris. 3. Absence of blood in the anterior chamber. 4. More rapid cicatrization. 5. More rapid return to permanent vision. 6. Lessened menace from secondary accidents. 7. More certain prevention of prolapse than even the combined method affords. The author believes that extraction after preliminary iridectomy lightens, in great measure, the

(1) The Ophthalmoscope, March, 1906.
(2) L'Ophtal. Provinciale, December, 1905.

PLATE III.

Herpes zoster ophthalmicus. Malignant case (Steven). Ocular herpes zoster. Minimum case (Steven). (Page 13.)

Herpes zoster ophthalmicus. Maximum case (Stieren).

Ocular herpes zoster. Maximum case (Stieren). (Page 43.)

PLATE IV.

task of the operator; that it converts into two relatively slight operations what would otherwise be a single important one. He agrees with the surgeon who declared: "Were I called on to operate on my father or my mother for cataract I would make a preliminary iridectomy."

Notes on Cataract Extraction. In cases predisposed to iritis, or gouty iridocyclitis Maddox[1] instils atropin at the close of the operation. 1. Suturing the conjunctiva is valuable in cases subject to sneezing, coughing, or where they are unruly. 2. Where the conjunctiva is not thoroughly healthy, or the lacrimal passages not beyond suspicion, a salt spoonful of boric acid is laid over the inner canthus before any dressings are placed on the eye. 3. He prefers simple extraction, or else preliminary iridectomy. A tongue-shaped conjunctival flap of small dimensions is preferred to a larger one. He does not approve of extracting the lens in its capsule.

Extraction of the Lens in Its Capsule After the So-called "Indian" Method Adopted by Major Smith, has occasioned much discussion recently. Dor[2] believes that the idea of the operation should be credited to Pagenstecher, who had a curette constructed with which to meet the requirements of this form of extraction. Many oculists have employed but subsequently abandoned it, and Dor would not now urge a trial of it had not Smith published such astonishing results. Smith, who operated at the Jullundur Hospital in British India, has had 11,000 extractions, 2,000 of which were done by the ordinary method; the last 9,000 (deducting infantile and regressive senile cataracts) were by the new form of operation. Smith makes a corneal wound sufficiently large to give exit to a large cataract; then he applies a strabismus hook upon the inferior third of the cornea, and at the same time by means of a curette depresses the sclerotic above the summit of the wound, and little by little with a reciprocating motion makes gentle pressure until the lens has half emerged, when he brings the strabismus hook up on the cornea in following the complete lens expulsion. Smith's figures, as given by him to Dor, refer to the extractions from May 31, 1904, to May 31, 1905, as follows: Num-

(1) The Ophthalmoscope, May, 1906.
(2) Revue Géneralé d'Ophtal., July 31, 1906.

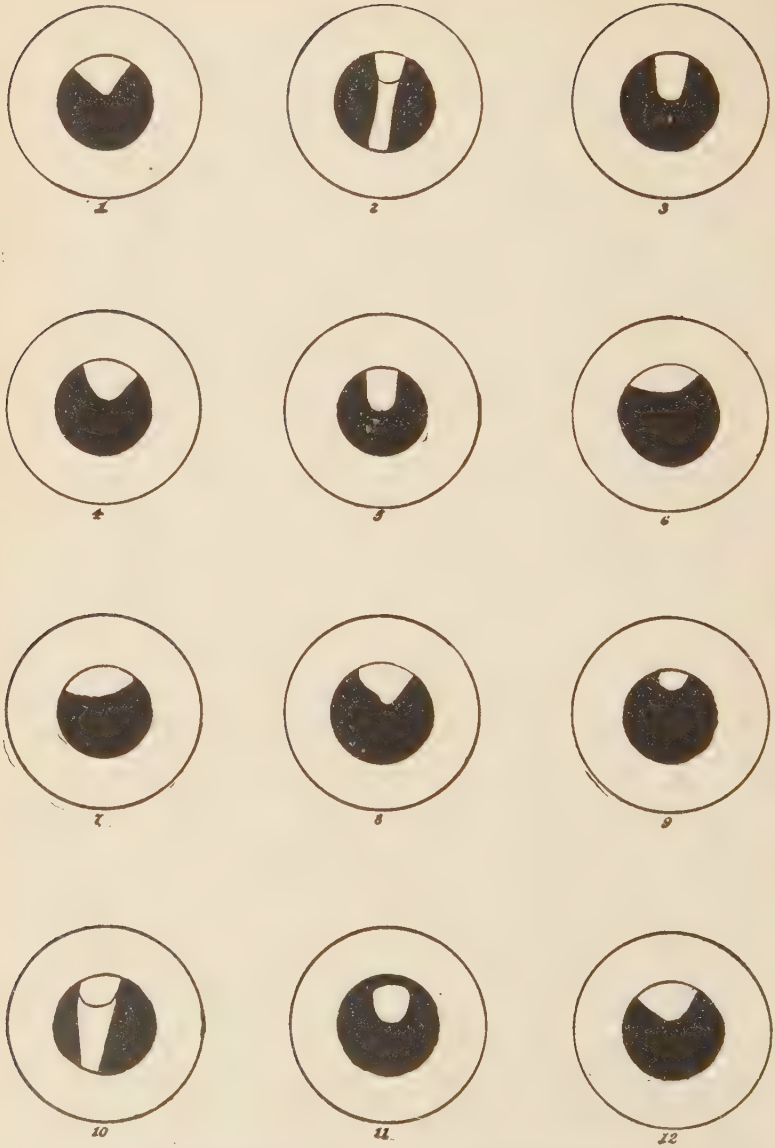


Fig. 5. The appearance of the pupil in Greene's cases of cataract extraction by the so-called Indian method.

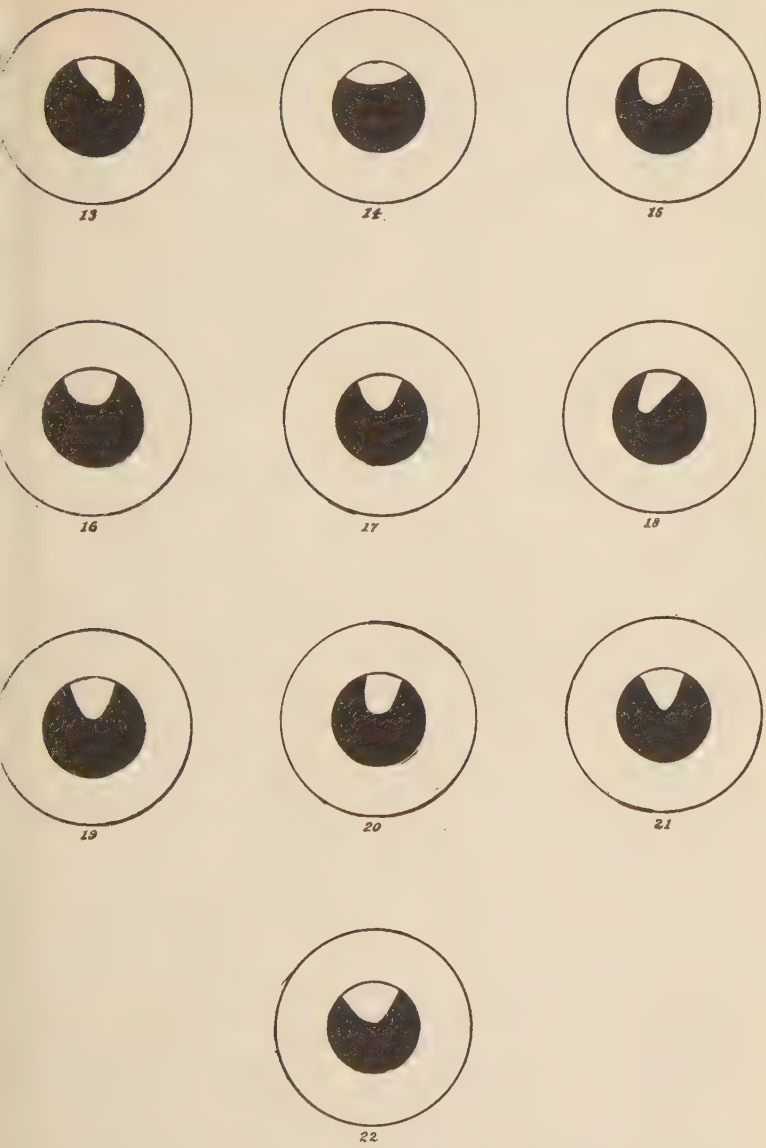


Fig. 6. The appearance of the pupil in Greene's cases of cataract extraction by the so-called Indian method.

ber of extractions, 2,616; iritis, 3/10 per cent.; loss of vitreous, 6 8/10 per cent.; rupture of capsule, 8 per cent.; capsule remaining in place, 4 28/100 per cent.; excellent results, 99 27/100 per cent.; less good results, 0.38/100 per cent.; loss of eye, 0.34/100 per cent. These figures correspond, Dor states, closely with those in Smith's first reports, and may be considered better than those obtained by other experienced operators.

In a paper on this subject C. F. Clarke[1] refers to *Major Smith's published reports of 99.27 per cent. "first-class results" in 2,616 operations in one year.* These statistics make his method well worth studying, but, since the acuity of vision is not definitely recorded, and not a very high standard is required by the average native of India, he questions if a rather high degree of astigmatism may not follow after a section situated so low in the cornea, midway between the normal pupil and the sclero-corneal junction. After reviewing the usual methods of capsulotomy, he gives especial consideration to that of Knapp, who attributes postoperative iritis, in part, to traumatism inflicted upon the iris, but especially to the ragged edges of the lacerated anterior capsule coming in contact with the iris. The writer thinks this is true where considerable masses of cortex remain, or where there is a rheumatic or gouty tendency, but he can not convince himself that where these masses have been cleared away by irrigation or otherwise the mere contact of the capsule with the iris produces iritic adhesions. In the series of 2,616 cases of Major Smith as referred to above, only two are reported to have developed iritis, which, if correctly reported, would make untenable the theory of traumatism. He believes the great advantage of Knapp's method lies, not in preventing the edges of the recently divided capsule from coming in contact with the iris, but in locking up the remains of the cortex in a pocket and keeping it away from that structure.

By means of a cystotome with a sharp and slender point he first makes a long, rather peripheral incision in the superior quadrant of the capsule; next he makes two vertical incisions, one tangent to the nasal and one to the temporal side of the somewhat dilated pupil; an attempt

(1) Ohio State Med. Jour., Sept. 15, 1906.

is then made to connect by horizontal incision the lower extremities of the vertical incisions.

If this latter maneuver is successful, the square segment may be brought away with the delivery of the lens, by irrigation of the anterior chamber or rarely, if necessary, by means of the forceps, leaving a clear and well-defined pupillary opening, seldom requiring a secondary operation, and even if the operator should fail to remove entirely the segment of capsule it often falls down or to one side and leaves a good central opening.

[The experiences of Greene, Standish, Cheney and others do not as yet furnish material for enthusiastic endorsement of the Indian method. Greene, in a paper before the Academy of Ophthalmology, gives the results of his experience as "no better than usual," and he pictures (reproduced here) the position of the pupil in 22 extractions by the so-called Indian method.—Ed.]

Loss of Vitreous in Cataract Extraction. The revival of the operation for extraction of cataract in its capsule (formerly known as Pagenstecher's operation) and the remarkably favorable results which have lately been reported by some operators have led Drake-Brockman[1] to look more critically into the subject. A record of cases extending over many years deals with, firstly, the 3-mm. flap operation *with* iridectomy, and secondly, the 3-mm. flap operation *without* iridectomy. Cases are taken consecutively as they are recorded:

1. *Pagenstecher's Operation.*			
Recoveries	Good vision	194	or 66.21 per cent.
	Fair vision	83	or 28.32 per cent.
Failures		16	or 5.46 per cent.
	Total	293	
Loss of vitreous		84	or 28.67 per cent.
2. *3 mm. Flap Extraction with Iridectomy.*			
Recoveries	Good vision	191	or 65.18 per cent.
	Fair vision	84	or 28.65 per cent.
Failures		18	or 6.81 per cent.
	Total	293	
Loss of vitreous		17	or 5.80 per cent.
3. *3 mm. Flap Extraction Without Iridectomy.*			
Recoveries	Good vision	220	or 65.08 per cent.
	Fair vision	60	or 20.81 per cent.
Failures		13	or 4.43 per cent.
	Total	293	
Loss of vitreous		3	or 1.02 per cent.

(1) The Ophthalmoscope, March, 1906.

Experience Gained by 1,284 Cataract Extractions with Iridectomy. In the eye clinic of the University of Berlin 1,284 cataract extractions with iridectomy were performed from June, 1900, to October, 1905, out of which seventy-seven showed complications before operation. No attention was paid to maturity of the cataract. Normal vision of the second eye was no contraindication, but the decision as to operation was left to the patient.

The preparation of the eye, as set forth by Köllner,[1] consists of cleansing with soap, irrigation with sterile salt solution, instillation of 10 per cent. cocain solution. The section comprises about one-third of the corneal circumference, 3/4 to 1 mm. distant from it in the sclera, and a conjunctival flap of 4 mm. length is formed.

In one case the lens was dislocated backward and upward and could not be removed with loop. It remained fixed at that place, V. = $\frac{1}{4}$. In a case of cataracta accreta, all attempts at extraction under profuse loss of vitreous were in vain.

A binocle is applied which is changed after twenty-four hours, replaced by a monocle for the next forty-eight hours, and this is renewed every twelve hours. The patients do not alter their mode of living. Hyphema during convalescence was mostly traumatic. In diabetes and anomalies of the renal functions recovery was frequently disturbed by iritis and cyclitis. Diffuse opacities of the vitreous occurred quite often, but as a rule were more or less absorbed.

Infection of the wound was observed in seven cases. It set in on the 3d, in one case on the 2d day. A number of patients complained of erythropia, one of kyanopia.

In the clinic 5 per cent., in private practice 10 per cent., secondary operations were performed. The correcting glasses were prescribed after four weeks.

Weber's loop was used in thirty-eight cases. In the majority opacities of the vitreous and cortical matter remained.

Of 116 cases which obtained full vision after correction, in twenty-seven cylinders were required, the least refracting meridian of the cornea coinciding with the axis of the coloboma of the iris. It could not be exactly determined

(1) Zeitschr. f. Augenheilk., p. 506, 1906.

how long the traumatic astigmatism remained constant. This was frequently observed after four weeks. Therefore, ordering astigmatic glasses was postponed longer than four weeks after the operation.

As to complications before operation, the results of extraction after former inflammations of the uvea were not favorable, as, *e. g.,* cases of cyclitis showed severe relapses after operation, detachment of the retina became more complete. Vision in chronic glaucoma remained essentially the same. The course of operation in traumatic cataract always was smooth, except in one case, in which loss of vitreous occurred. Köllner emphasizes the necessity of giving due consideration in cataract patients to general diseases and their relations to wound-healing and its complications.

Kyanopia After Cataract Extraction. Kyanopia has been observed by Enslin[1] in numerous cases immediately after extraction of cataracts, mostly nuclear cataracts. It gradually decreased and disappeared after one or two weeks, and was never seen later than one month after the operation. Enslin explains the phenomenon by the theory of contrast. The human crystalline lens has, from childhood on, a yellowish hue, which increases with advancing age and is more pronounced in cataract, particularly nuclear cataract. In such eyes yellow rays have been acting on the retina for years, while the blue rays were absorbed by the yellow lens. *After removal of cataract the contrasting blue rays suddenly gain entrance to the retina and arouse intense blue vision.* This very rarely occurs if much cortical matter remains in the eye, which at first admits little light, gradually more by being absorbed, thus preventing the action of contrast. The few cases of kyanopia published are of cerebral etiology and have no bearing on kyanopia after cataract extraction.

The Knife-Needle Operation for Secondary Capsular Cataract. Jackson[2] calls attention to the disastrous results which have so often followed the secondary operation for cataract and attributes such results to faulty operative technic. He operates with the single knife-needle, and believes that proper attention to the following rules will

(1) Zeitschr. f. Augenheilk., p. 136, 1906.
(2) Archives of Ophthal., May, 1906.

make this operation one of the safest in eye surgery: 1. To see the operation there must be a strong oblique illumination of the eye, and the surgeon must possess powerful accommodation or use spectacles with strong convex lenses, or a binocular magnifier. 2. The knife-needle must be perfectly sharp, and its shank must exactly fill the external opening to prevent the escape of aqueous. 3. The knife-needle must be entered through the vascular tissue of the corneal limbus, and not through the clear cornea. 4. Placing of the incisions in the membrane. Jackson emphasizes particularly the point of entrance of the knife-needle; that it must be through the vascular tissue of the corneal limbus, the operator thus gaining two distinct advantages: practical immunity from infection by going through a vascular tissue, and a longer leverage. In the vascular tissue the wound is closed with fresh blood and infection prevented. While in the corneal puncture the greater bruising, due to a short leverage, falls on a non-vascular tissue, exposed in a conjunctival sac, which can never be rendered sterile.

The author makes the T- or V-shaped incisions through the capsule.

Spontaneous Reposition of a Lens Dislocated by Traumatism. A student received a blow on the right eye with a dull rapier and shortly afterward came to Possek.[1] The lower part of the anterior chamber was deeper and the corresponding section of the iris receding, the upper part obliterated. The lower margin of the lens was raised. From the subsequent astigmatism the details of fundus appeared larger in the horizontal meridian.

Possek's case is remarkable, in that reposition of the lens had taken place the next day, after atropin and bandage. Probably some fibers of the zonula had been lacerated and, vitreous entering the gap without tearing, the hyaloid membrane had to hold the lens against gravity. After the vitreous had retreated the lens returned to its natural position. Vision and accommodation became normal. The right pupil, however, remained a little larger than the other.

(1) Klin. Monatsbl. f. Augenheilk., p. 381, 1906.

THE UVEAL TRACT.

Pupillary Athetosis or Hippus. So-called *hippus is a rare symptom,* observed in connection with certain ocular affections, particularly nystagmus. Fromaget[1] reports the following case: A laundress, 38 years of age, in good health and without hereditary taint, applied for treatment of a slight blepharospasm of the right eye which was otherwise normal. There was almost complete ophthalmoplegia—extreme divergence and partial ptosis of the left eye. The pupil of this eye, examined in full light, appeared to be of the same size as the other—about two mm., but in testing the reflex by raising the eyelid, after a few seconds of exclusion, and exposing the eye to a bright light, the pupil dilated slowly, instead of contracting. When it reached the maximum of dilatation the pupil maintained it for three or four seconds and then slowly contracted for eight or ten seconds and maintained the maximum of contraction for ten seconds. Then the sphincter yielded and the pupil returned slowly to the state of dilatation, the action lasting about 30 seconds. After three seconds of arrest, the phenomenon was repeated, so that every minute the pupil changed its form, with equal rests at the maximum of dilatation and of contraction.

The author thinks that the symptoms point to a nuclear lesion, probably of encephalitic origin, and that the phenomenon called hippus is a myosis which occurs in a rythmic manner, in an iris in a state of mydriasis. The sphincter of the iris, under the influence of a central excitation, contracts slowly, during some seconds, the maximum contraction persists about ten seconds and then, the excitation failing, the sphincter relaxes slowly to reproduce the mydriasis.

Those contractions, occurring slowly in a muscle incompletely paralyzed, resemble what occurs in other muscular territories and has been studied by Hammond, Charcot and others under the name of athetosis.

It is probable that in the case under consideration the nucleus of the oculo-motor of the left side had been in great part destroyed, but that, in association with the

(1) Archives d'Ophtalmologie, April, 1906.

destruction, there are irritative phenomena which cause this rythmic spasm of the sphincter.

With this view of the pathogeny, we may explain the associated rhythmic contractions of the motor muscles of the eye which constitute nystagmus, and which might be called ocular chorea or athetosis according to their rapidity.

Siderosis Bulbi. Kipp[1] reports a number of examples of this condition. He has seen some cases in which the cornea was stained brownish for some distance around a fragment of iron which had been lodged in it for weeks, but never from iron located in the lens or deeper in the eye.

The change in the color of the iris was seen only in cases in which the yellowish brown dots arranged in the form of a wreath under the anterior capsule of the lens were present at the same time; both a yellowish brown and a greenish brown discoloration was observed, but the first more frequently. Attention is called to the occurrence of a similar discoloration after extensive hemorrhage into the vitreous and sometimes into the anterior chamber.

The change which he regards as of greater practical importance, is the appearance of the yellowish brown spots under the capsule to which repeated reference has been made. They are of round form, less than ½ a mm. in diameter, are of a yellowish brown color, and appear at regular intervals at a mm. or two, in a circle, in or about the capsule of the lens. In addition to these spots there often are others on the anterior capsule, also of a yellowish brown color, but situated much nearer to the anterior pole —the remains of broken posterior synechiæ. The spots behind the capsule are only seen after nearly ad maximum dilatation of the pupil. The writer has seen these spots in eyes in which the lens was still transparent and in which the capsule had not been ruptured. In all the cases in which they were present the fragment of iron was found back of the lens. Before the days of the sideroscope, he had repeatedly cut open the eye and extracted the fragments of iron by means of the small electro-magnet, on no other evidence of the presence of iron in the eye than the spot here described. Even now he would not hesitate to operate, if both the Roentgen ray picture and the sideroscope failed to reveal the presence of iron in the eye, if the

(1) Amer. Jour. of Ophthal., August, 1906.

spots here described, together with the discoloration of the iris, were present.

Among other symptoms of siderosis bulbi are mentioned ochre coloring of adhesions between iris and lens, spontaneous mydriasis, spontaneous subluxation of the lens, torpor of the retina, concentric contraction of the visual field and defective color perception.

The paper concludes with a résumé of v. Hippel's results of his investigations. The question why the lens spots beneath the capsule are almost uniformly found in the same region and of the same form has as yet not been satisfactorily answered, and this also applies to the question why do not all eyes containing fragments of iron give outward evidence of its presence. The length of time intervening between the entrance of the foreign body and the first appearance of outward signs of siderosis seems to vary considerably; in all of the writer's cases the iron had entered at least six months before the patient was seen.

On the Complications of Heterochromia. Reports of 38 cases, observed within the last 15 years, are given by Fuchs.[1] The majority occurred in men, and then in the third decade of life. No constitutional causes could be ascertained, which generally explained the predominance of chronic cyclitis with percipitates in women. In most pronounced cases one iris was brown, the other blue or gray, or the irides of both eyes were light, but of different hue, generally such that the darker iris was greenish, the lighter gray or blue. The examination of a green iris with a strong magnifying glass shows numerous minute yellow spots of the anterior layers, which give the effect of green, just as a mixture of blue and yellow pigments, by subtraction. In some cases the one iris was gray, that of the diseased eye blue. Here the anatomic difference lies not in the different amount of pigment, but in the thicker stroma of the gray iris. In any case the difference of color is caused by the condition of the stroma, not of retinal pigment, which, however, may also be altered, secondarily by chronic inflammation. Where specially noted, the hair on the head was dark brown or black even when both irides were light, showing an insufficient development of the pigment of one iris or both and then unequally.

(1) Zeitschr. f. Augenheilk., p. 191, 1906.

The eye with the lighter iris was cataractous in 33 cases. Most frequently the cataract commences at the posterior cortex in form of opacities, either fine like dust or irregular like cobwebs, never presenting the typical stars or rosettes. Heterochromia is regularly accompanied by precipitates on the posterior surface of the cornea. The pupil was larger on the lighter eye.

With regard to the etiologic relation of the three symptoms, heterochromia, cyclitis and cataract, Fuchs remarks the following: Heterochromia may occur as lusus naturæ, without any disease, or it is pathologic. A morbid cause, so far unknown, prevented the iris from acquiring its normal amount of pigment, as shown by the fact that most of these patients have dark hair and ought to have dark irides, and at a later date show the disease proper. The morbid cause has a particular affinity for the uvea, especially its anterior portions. Its action commences before or shortly after birth, since the variety of color of both irides is observed in the first few years of life, and continues for many years, producing the disease of the eye frequently at advanced age, gradually without external inflammatory symptoms. No other changes are observed but heterochromy, cyclitis and cataract. The cataract is most likely due to cyclitis. If the affection be due to anomalies of circulation or of any interior secretion (one may think of Addison's disease or vitiligo) or anything else, it is peculiar that only one eye should be affected. Therefore, Fuchs advises us to examine cases of bilateral juvenile cataract very carefully for precipitates on the posterior surface of the corneæ, especially if both irides are light and the hair is dark, and cases in older people with light irides and cataract, which has a marked light color or whose nucleus when extracted is white and soft. In two cases of this latter kind (one aged 40, the other 65) Fuchs found in the excised pieces of iris the same changes as in heterochromia. He finally emphasizes the fact that he observed in three of his cases small chorioiditic foci in the darker eye and at the anatomic examination of a case of heterochromy changes in both eyes.

Statistics Concerning the Etiology of Iritis. Gutmann[1] examined 150 cases of iritis in Michel's clinic. He found

(1) Wien. med. Presse, April 15, 1906.

one case of tuberculous iritis where the process was limited to the eye. In forty cases, however, the tuberculous iritis was associated with a similar process in the lungs, glands, skin and other organs. In four of these cases tuberculous nodules were visible in the ligamentum pectinatum. In eight cases the iritis was complicated by chronic nephritis and in twenty others there were disturbances of the circulatory system—prehensile endarteritis. In forty-five cases the iritis was syphilitic in origin. In twenty-two cases the iritis appeared early in the disease, together with the skin eruption and the appearance of condylomata. Few cases only appeared at a late stage of the syphilis. Three cases of gummatous iritis were found in infants suffering from congenital syphilis. In five cases the iritis was complicated by gonorrhea. In five other cases there was a history of rheumatism. Six of the cases showed a complication of two or more diseases, *e. g.,* apical tuberculosis, endarteritis, syphilis, arthritis, etc. In two cases only chlorosis was found. In sixteen cases the iritis was primary and uncomplicated by any other disease. Eighty-six of the patients were males, sixty-four females. Various ages were represented—from infancy up to 70 years. These statistics show that beside syphilis, tuberculosis, chronic nephritis, rheumatism and endarteritis are important etiologic factors in iritis.

The Treatment of Various Forms of Iritis by Acetozone. During the last sixteen months Wray[1] has treated all his cases of intraocular inflammation on the assumption that they were the result of bacterial action, and with gratifying results. Using gonorrheal iritis as an example, he reasons that the inflammation is due to the action of toxins and that the portion of the iris suspended in the aqueous and laved on both surfaces by toxin-laden fluid renders it particularly liable to attack; this reasoning may also be applied to syphilis and tuberculosis and possibly also to diabetic iritis, although the presence of sugar may be a factor.

A most unsatisfactory feature of constitutional treatment is the slowness of its action. In the treatment of intraocular inflammations we must use remedies that we can rely upon to act in a few hours. If the toxins are in

(1) Medicine, October, 1906.

the aqueous they are obviously on their way into the general circulation. As this form of metabolism can be increased by compelling the patient to drink water copiously, all his patients were instructed to take exercise and copious potions of water.

Having made it a rule for several years to inquire into the condition of the bowels in all cases of ulceration of the cornea and eye inflammations, he has found, especially in children, they are mostly foul, often very foul, and the association is so frequent it can scarcely be a fortuitous one; hence he used to begin the treatment of such cases by the internal administration of resorcin, salol, etc. He then found that acetozone was used with considerable success and safety in typhoid, and inferred, as it can be used in such asthenic conditions with advantage, it might be useful in an intestinal and general antiseptic in eye diseases. At first he gave it in three-grain doses, five times a day, in four ounces of water. Subsequently the amount of water was increased materially, and his present method is as follows:

The patient drinks a tumbler of water and takes his capsule immediately, after which he walks briskly for 10 minutes, and then takes a second glass of water, and again walks for 10 to 15 minutes. The first dose is taken before breakfast, the next in the middle of the morning, middle of the afternoon, and in the evening.

The acetozone-hydrotherapeutic treatment was used in 45 cases of iritis, serous iritis, and interstitial keratitis, also in one case of syphilitic optic neuritis and two cases of sympathetic ophthalmia. If seen early before the fourth day, iritis cases not infrequently experience relief from pain in a few hours, absence of redness on the sixth or seventh day. Of course, atropin and sometimes dionin were used at the same time.

Nine cases of interstitial keratitis were treated by acetozone with excellent results. He claims that the results in all forms of iritis are admirable, and equally so in interstitial keratitis, when seen within a week or so at the commencement of the disease. In the latter two or three days at times suffice to remove the corneal opacity, and nothing remains but a little keratitis punctata. There is no reason why the treatment should not be combined with inunction,

but in nearly all the cases treated by acetozone, mercury had been tried for at least six weeks and in some cases for several months. The only objection to acetozone is the price, and this is a consideration if the drug has to be used for several weeks.

Metastatic Chorioiditis. Roosa[1] has reported the case of a man, 37 years of age, who suffered from extravasation of urine and pus in the groins. There was a gangrenous condition of the adjacent tissues, with edema of all the tissues around. Incisions were made and also a perineal section. He had been operated on, eighteen years before, for stricture and his trouble doubtless depended on an infection years before. He was recovering from the operation when the condition of the eye was observed. There was exophthalmos, chemosis and edema of the connective tissues. Pupil immovable, a yellowish deposit in anterior chamber. The case was diagnosed as metastatic intraocular infection or metastatic panophthalmitis. The eye was removed later and a pathologic examination made by E. L. Oatman. He classified the disease as metastatic gonorrheal iridocyclitis.

The Chorioid at the Macular Region. In sections of the eyes of albinos, examined by Nettleship, pigment was present in the chorioid, but limited to the yellow-spot region. Usher[2] has since examined eleven normally pigmented eyes and had found (1) a deeper pigmentation of the retinal epithelium at the yellow-spot region and an increased thickness of this layer, (2) a marked increase of the pigmentation of the chorioid, and (3) an increase in the thickness of the chorioid. From the above observations it may be expected that if pigment were present at all in an albino's eye it would be found in the macular region.

THE LACRIMAL APPARATUS.

Nasal Treatment of Epiphora. In quite a number of cases of epiphora Meyer[3] has observed a peculiar form of the lower turbinated body. Its surface closely touched the lateral wall of the inferior meatus, thus obstructing the mouth of the naso-lacrimal duct, which lies about the

(1) The Post Graduate, July, 1906.
(2) Brit. Med. Jour., July 21, 1906.
(3) Berlin. klin. Wochenschr., p. 751, 1906.

middle point of the lower turbinated body. In 500 or 600 cases Meyer deflected the attachment of the lower turbinated body to the lateral wall by turning it 30° to 50° toward the septum with Heymann's forceps, modified by Killian. The epiphora disappeared after two weeks.

Extirpation of the Lacrimal Sac. An instructive article on this subject is that by Brewerton.[1] Celsus destroyed the lacrimal sac 1,800 years ago by cauterizing freely down to the bone. This treatment, however, was only used when a fistula existed. Platner, 1724; Rosas, 1830, and more recently Arlt and de Wecker made mention of it. It remained for Berlin to bring the subject prominently before the profession. Very little was done from this time until 1881, when Schreiber's paper appeared. From this time the operation was performed in Germany more frequently. Indications for the operation are: 1st. Lacrimal fistula. 2d. Chronic dacriocystitis, which does not respond to nasal treatment and local treatment to the lacrimal passage for three months. 3d. When a patient is suffering from hypopion ulcer or ulcus serpens. 4th. As a preliminary to operations on the globe when dacriocystitis is present. 5th. In cases of caries of the ethmoid with dacriocystitis. Several methods of operating are described. Hoffmann's consists in removal of the sac by the conjunctival route. Schreiber's consists in removal of the sac through a skin incision running vertically between the caruncle and the anterior lacrimal crest. Kuhnt makes his incision more to the nasal side, which begins about 4 mm. above the palpebral ligament and passes downward over the anterior lacrimal crest, dividing the ligament, and from thence downward along the margin of the orbit for 20 or 25 mm. Cirincione has improved upon Kuhnt's method by removing the whole of the mucous membrane of the nasal duct. He makes a skin incision of about 40 mm. in length. A special knife is used to remove the mucous membrane of the nasal duct. Toti advocates the resection of a piece of bone to include part of the nasal process of the superior maxilla and the entire breadth of the lacrimal fossa. The author believes that the reason why epiphora is not more annoying after this operation is because in the normal condition the

(1) The Ophthalmoscope, April, 1906.

lacrimal gland is not active and that it is only excited to activity by emotional disturbances or reflex irritation.

Another article by Tooke[1] on the *extirpation of chronically inflamed tear sacs* advocates the routine practice of removing this source of infection as a preventive measure against ulcers and other pathological conditions of the cornea. Axenfeld finds that nearly 80 per cent. of these cases belong to members of the working classes, and nearly 35 per cent. result in blindness due to permanent dense opacities of the cornea.

Ricchi finds the micro-organism by far the most frequently found to be the staphylococcus albus. One organism, that most dreaded in cases of corneal abrasion, the pneumococcus, is, strangely enough, not included by Ricchi in this classification. No more fertile culture medium can be found than the lining of the sac.

In dacriocystitis the stricture is produced as a rule, not by the swelling of the mucous cells as we would suppose, but by an engorgement of the subperiosteal veins. Probing the sac in such cases can easily be seen to be useless. The writer follows the method of operation as employed by Axenfeld, under a general anesthetic. The field of operation is rendered as aseptic as possible by the use of soap and water and a solution of bichlorid of mercury. The initial incision is made from the inner canthus directly above the internal angular linament, 2 or 3 millimeters in front of the crista lacrimalis. The incision should be directed downwards and outwards in a concentric direction for about two and a half centimeters. This incision must be quite deep, cutting through the periosteum. A shorter incision should not be attempted, for unless the aperture is made sufficiently large to expose the fossa and its contents there is always danger of leaving a part of the secreting membrane of the sac *in situ*. Subsequent fistula formation is the inevitable result. The periosteum is now carefully retracted forward over the edge of the crista lacrimalis and downward as far as the bony canal covering the nasal duct. The lacrimal sac should be seen nestled in the underlying fossa lacrimalis. The sac is now seized by a pair of fixation forceps and drawn gently forward, while a careful dissection with a pair of small, sharp-pointed,

(1) Montreal Med. Jour., May, 1906.

curved scissors is begun below the sac. At this juncture the writer introduces a tenotomy hook under the sac. He is then able to follow the sac downward to the nasal duct and upward to the puncta, always cutting beneath the heel of the hook without fearing of wounding the sac above. The sac is severed as close to the puncta above and to the nasal duct below as is possible. When the sac has been removed a specially devised curved curette is introduced into the nasal duct which is quite denuded of its mucous surface. The edges of the skin wound are brought together by a few silk sutures, a small, firm roll of absorbent cotton is placed over the line of incision, and a firm compress dressing is applied.

Dislocation of the Lacrimal Gland. A girl of 13, while playing basket-ball collided with another player and sustained a dislocation of the lacrimal gland. It could be replaced by pressure, but after applying a compress it was left off on the fourth day when the dislocated gland again presented. The pressure was again resumed and continued for two weeks when the gland remained in its normal position. This rather rare and interesting condition[1] is reported by Crowder.

RETINA AND OPTIC NERVE.

Probably the most important contribution to **affections of the optic nerve** that has lately appeared is contained in an address before the American Academy of Ophthalmology by Marcus Gunn.[2] He enumerates the channels through which the nerve may be affected as follows:

1. From its developmental history and from its structure the optic nerve is to be regarded as forming part of the central nervous system.

2. The optic nerve, throughout its entire extra-cranial course, is enveloped by sheaths which are a direct prolongation of the meninges, and the spaces between these sheaths are continuous with the spaces between the meninges of the brain. The wider and more important of these intervaginal spaces of the nerve is the subarachnoid,

(1) Ophthalmic Rec., September, 1906.
(2) Ophthalmology, January, 1907.

because the subarachnoid space of the brain, with which it is in direct relation, contains a relatively large amount of the cerebro-spinal fluid, and is again in direct communication with the cerebral ventricular system through the foramina of Magendie and of Key and Retzius. This continuity between the sheaths, sheath-spaces and contained fluid of the brain and optic nerves is of pathological importance, as explaining the possibility of a direct transmission of disease from brain to nerve, or vice versa.

3. Their position at the base of the brain renders the intracranial optic nerves, with their commissure and tracts, prone to suffer in inflammation of the basal meninges, and liable to be damaged by direct pressure of new growth, aneurism, or a distended third ventricle. It is sufficient to give bare mention to this cause of optic nerve disease here; the causation is obvious, and examples are not infrequent.

4. After its entrance into the optic canal, the nerve has, for the rest of its course, all the exposures of a peripheral nerve. Thus, while still in the optic canal, the nerve may be pressed upon unduly by a diseased ophthalmic artery; may be involved in a syphilitic affection of the bone or its covering; may suffer through the thin inner wall of the canal from an altered sphenoidal sinus; or may be injured in fracture of the base of the skull. It is important to remember that in this intra-canalicular part of its course the dural sheath is intimately adherent to the bone, and is also closely applied to the pial sheath and optic nerve trunk, though not so intimately as to prevent all passage of fluid along the subarachnoid space. This is an important fixed area, preventing the nerve from being displaced either way when pulled upon.

In the orbit the nerve may be inflamed along with the other tissues in an orbital cellulitis; it may be implicated through rheumatic or other affections of its sheaths; may be injured in orbital wounds, or may undergo atrophy from pressure exerted upon it by tumors or by hemorrhage into the inter-vaginal space surrounding it. At its termination in the papilla, the nerve may suffer in a peri-papillitic chorioidal atrophy by a cutting-off of the main part of its local blood supply, or may become affected by a continued supernormal intra-ocular tension. In its passage through

the scleral aperture, the nerve fibers are liable to strangulation by the tight meshwork of the lamina cribrosa; this may occur in any form of swelling of the nerve trunk, or in an altered thickened state of the fibrous tissue framework.

5. *The optic nerve fibers may degenerate secondary to destruction or impaired nutrition of their ganglion cells in the retina.*

(a) These ganglion cells may suffer (a) along with other retinal structures in atrophy of the retina following total embolism or thrombosis of the arteria centralis; in pigmentary degeneration of the retina—primary or secondary; or in retinal detachment.

(b) In some forms of poisoning, as *e. g.,* from nicotine and bisulphide of carbon.

(c) From an inherited neuropathy. Under this heading may be included the changes in amaurotic family idiocy, cerebral diplegia and possibly Gowers's so-called abiotrophy.

6. *The optic nerve may suffer from an extension of an ocular inflammation.*

7. *Lastly, the optic nerve may, like other parts of the body, suffer from a general influence produced by serious disease,* as *e. g.,* in renal disease, syphilis, tuberculosis, severe anemia, and rarely in acute febrile diseases.

Uniocular Inflammations of the Optic Nerve and Retina. A series of clinical observations which show that affections of one eye are not as rare as ophthalmologic literature would lead us to believe is reported by Hubbell.[1] A summary of the cases shows that the optic nerve was affected in four of them, intraocularly in three, retroocularly in one. Three were females and one male, with ages varying from 16 to 43, and all apparently in good health. All four cases recovered with almost normal fundus and vision. In four cases the inflammation involved both nerve and retina. Two were males and two females, one of 24, all the others being over 61. One patient had calculi and inflammation of the right kidney, one had questionable general arteriosclerosis with chronic albuminuria. In three cases the vision was practically lost by atrophy. In one it was regained and became nearly nor-

(1) Jour. Amer. Med. Assoc., July 7, 1906.

mal. In ten cases the inflammation was apparently limited to the retina and varied greatly in intensity. Three cases recovered, one was lost, and in six the result is unknown or still undecided. General condition was good in six cases. In three cases there was arteriosclerosis. Hubbell has never seen a case of optic neuritis that was not uniocular, except when there was syphilis or brain tumor, nor a case of neuroretinitis or of retinitis that was not uniocular, except when there was double orbital cellulitis, Bright's disease, diabetes or syphilis, and then it was typical of these diseases. Treatment has invariably been the administration of the iodids.

Retrobulbar Neuritis After Burns of the Skin. A healthy laborer, aged 19, sustained, by explosion of a benzine lamp, burns of the first and second degrees of the dorsal sides of both hands, the lower two-thirds of the forearms and of the face. After two or three weeks he complained of pain in both eyes, especially when moving them. This disappeared after a week, but his sight commenced to fail. Seven weeks after the accident Lindemeyer[1] found the borders of both discs indistinct, temporal halves slightly pale, vessels normally filled. At the right upper margin of the disc, several small retinal hemorrhages, at the upper temporal quadrant of left disc a hemorrhagic dot. Finger counting in each eye at 1 m. Central, absolute scotoma for white and colors; visual fields not contracted. Under diaphoresis, iodid of potash in large doses and subconjunctival injections of salt solutions, V. R. rose to 1/xv; V. L. to 1/xxxv.

Mooren, who first called attention to these affections, observed bilateral optic neuritis after superficial burns of both legs. Generally the retina is chiefly affected in the form of hemorrhagic retinitis. Most cases give a favorable prognosis with regard to restoration of vision, probably because the optic nerve is scarcely involved.

In this case the author considered the prognosis bad, on account of the retrobulbar neuritis which had descended to the optic disc. As it corresponded exactly with the type which we generally observe in intoxications, the

(1) Klin. Monatsbl. für Augenheilk., p. 495, 1906.

author ascribes the etiological connection with the burns of the skin to a toxemia.

Retrobulbar Optic Neuritis following Childbirth. A case of this kind, ending in atrophy of the optic nerve, is reported by Kipp.[1] Whitening of part of the eye lashes and eyebrow of the same side, after repeated gestation, was observed by the writer who concludes that the pregnancies caused a disturbance in the vascular supply, a congestion at or near the apex of the orbit, pressure on the optic nerve and its sheaths and on the branches of the ophthalmic branch of the fifth nerve. Whitening of the lashes has been observed in severe iridocyclitis of sympathetic origin. In this case only the hairs in the line with the supraorbital nerve were affected. The change in color took place in the course of a few days. A second case of neuritis is reported in which recovery took place. Vision returned to 6/5 and color fields were complete, although the ophthalmoscope showed marked atrophy of the papilla without any change in the caliber of the retinal vessels. Iodid of potassium in 10-grain doses had been given for six weeks. There was no sugar or albumin in the urine.

Coloboma Maculæ Luteæ. Cases of this kind are rare and have not been properly understood, having been mistaken for chorioidal changes. Fischer[2] describes a case—in a girl of 15—who developed convergent squint at the age of 3 weeks. No other members of her family have eye defects. Ophthalmoscopically there is a spot in the macular region of about five times the size of the disc. Its edges are surrounded by pigment. The interior of this defective area is mottled with yellow and brown pigment. The unpigmented areas have a pearly, glistening white color. The refraction of the defective area is myopic and varies from 0.75 to 3 D. The whole area seems to be lined by a clear veil, into which the retinal vessels are continued. The other eye contains a similar defective area below the macular region.

Visual Troubles Caused by Observing Eclipse of the Sun. Five cases of ocular sunstroke have been added to the already long list by Ferentinos.[3] They suffered with

(1) Journal Am. Med. Assocn., June 30, 1906.
(2) Annals of Oph., January, 1906.
(3) La Clinique Ophtal., April 25, 1906.

visual difficulties, more or less marked, following observations of the solar eclipse last August. *The affection was characteristic, the ophthalmoscope revealing a yellow exudation at or near the fovea.* In the recent cases there was a red spot the size of a lentil at the level of the macula, the center of which was grayish. The prognosis, in spite of the symptoms, is favorable. The treatment is expectant. Iodid of potash is useful, strychnia apparently useless.

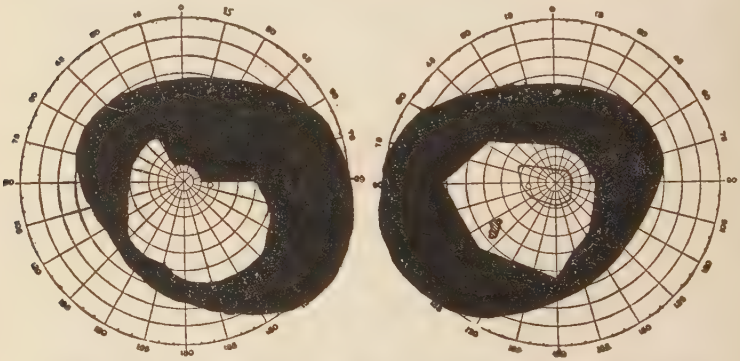
Contributions to the Operative Treatment of Detached Retina. No operative treatment gives assurance of certain recovery from detachment of the retina, and the cures numerously published admit of no certain conclusions as to the value of any method of operation. Wernicke[1] quotes the literature of permanently cured cases up to 1905, which had been observed for at least a year. The total number of cured cases is 351, of which 84=24 per cent. were operated on, 158=45 per cent. treated, 109=31 per cent. not treated.

At Uhthoff's clinic twenty-two cases of detachment of the retina were permanently cured from March 1, 1896, to March 1, 1903. In the last two years fourteen further patients were seen, of whom the histories are briefly given. These recoveries occurred in 422 cases of detachment of the retina (8.5 per cent.): Eight were treated with operation, 10 without operation, 18 not at all. The causes were in 25 myopia, in 3 traumatism, in 8 unknown. On 65 cases out of 422 the following operations were performed: 1. Repeated punctures with von Graefe's knife in 9 cases=15 per cent. One case was cured. In the other four the readjustment lasted only for a few days or weeks. 2. Puncture with von Graefe's knife or Knapp's discission knife with following subconjunctival injections of 2 to 5 per cent. NaCl in 41 cases=62 per cent., of which 2 remained cured, 11 showed reattachment for some days or weeks. 3. Galvano-cauterization with divers punctures in 13 cases=20 per cent., of which 2 were permanently cured, 7 transiently. 4. Discissions of the vitreous, according to Deutschmann, in two cases yielded no favorable results. Not more than 15 cases=7.8 per cent., were permanently cured by operation. Only one case was dam-

(1) From Uhthoff's Clinic in Breslau, 1906.

aged, so that even in consideration of this small number of results operation seems to be indicated.

Obstructive Disease of the Retinal Vessels. An exhaustive article on this subject by Reber[1] deals with all the aspects of the condition, whether due to arteriosclerosis,



Figs. 7 and 8. Fields of vision in Reber's case of diffuse sclerosis of the retinal and chorioidal vessels.

true embolism from distant parts of the vascular system, or to thrombosis. Among others he gives Marcus Gunn's classification of the local vascular changes and adds to

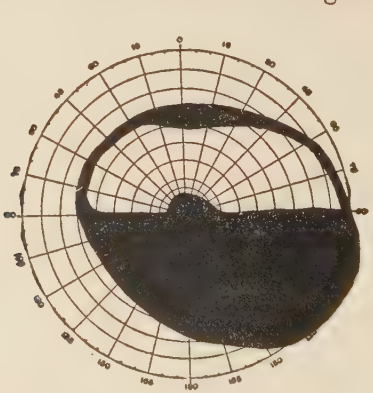


Fig. 9. Visual field in a case of retinal embolism (Reber).

(1) Ophthalmology, January, 1907.

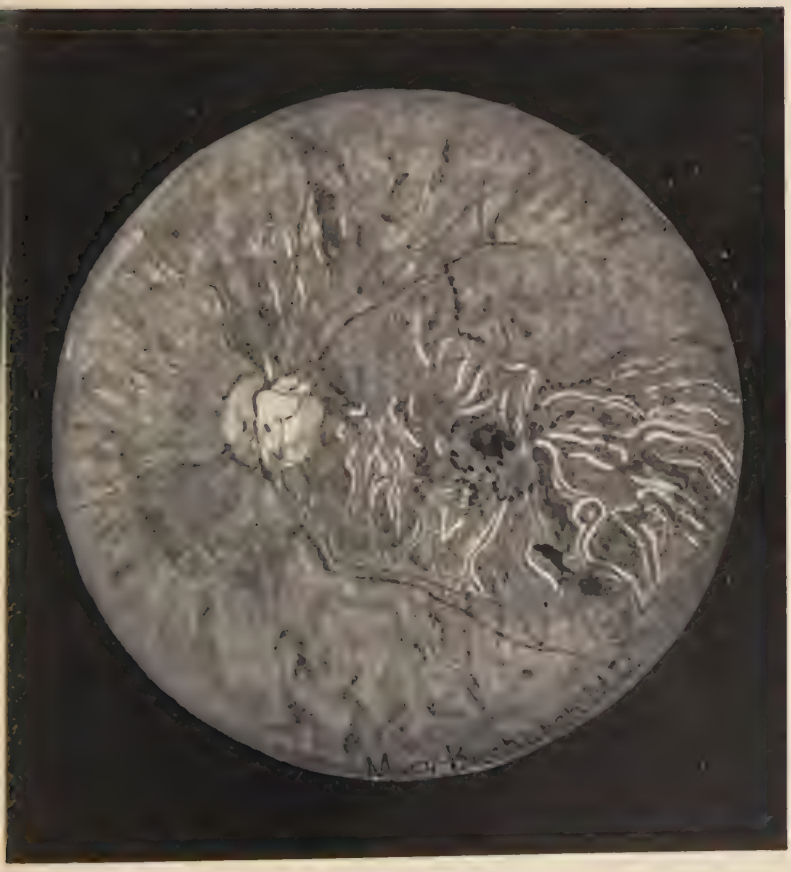


PLATE V.

Diffuse sclerosis of the retinal and choroidal vessels (Reber). (Page 73.)

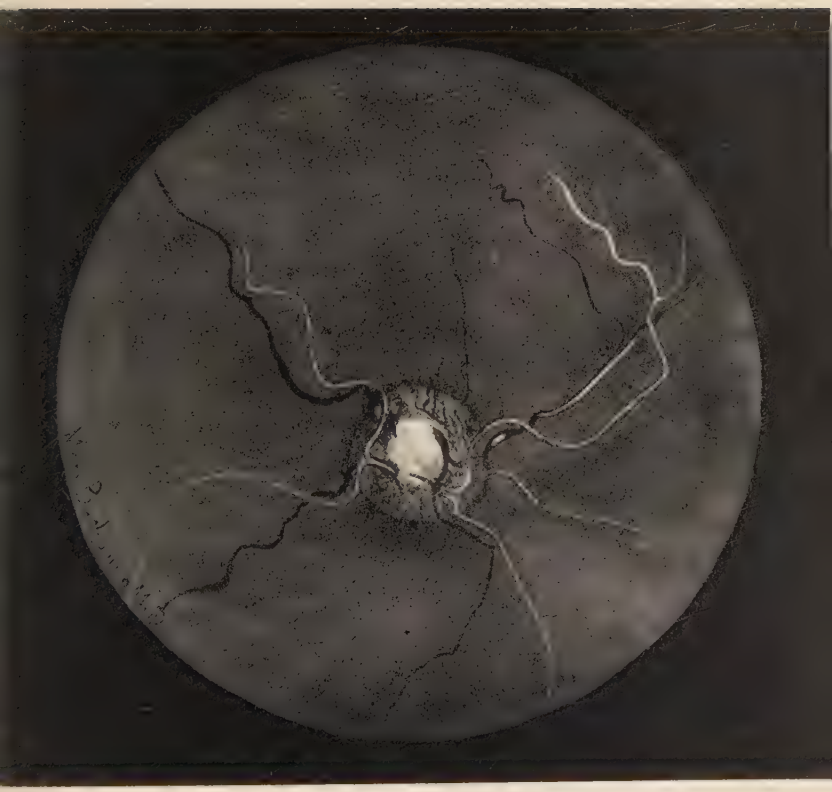


PLATE VI.

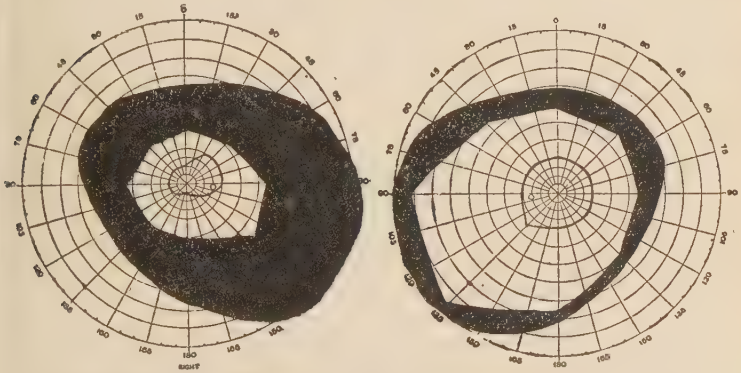
Fundus view of a case of thrombosis retinalis (Reber). (Page 73.)

PLATE VII.

Fundus appearances of a case of retinal thrombosis with extensive hemorrhages (Reber). (Page 73.)

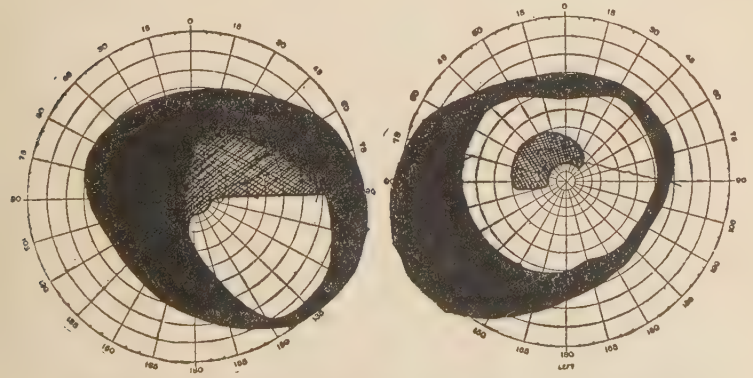
them de Schweinitz's observations of the very early, fine, corkscrew tortuosity of the small macular vessels and a brick-red congestion of the nerve-head:

1. Alterations in the course, caliber, size and breadth of the retinal arteries, tortuosity and bending of the vessels being prominent signs.



Figs. 10 and 11. Visual fields in Reber's case of retinal thrombosis with extensive hemorrhages.

2. Alterations in the reflections and translucency of the walls of the retinal arteries manifesting themselves in increased disturbance of the central light streak, loss of



Figs. 12 and 13. Visual fields in two cases of retinal embolism (Reber).

vessel translucency with the formation of whitish stripes showing degeneration of the walls or perivasculitis (silver wire artery).

3. Alterations in the course, caliber, size and breadth of the retinal veins exactly as they occur in the arteries, with the addition of indentation of the vein when crossed by an artery.

The Treatment of Recent Embolism of the Retinal Arteries by Deep Digital Massage. In addition to his report of two cases of recent embolism of the central artery of the retina, in one of which all visual functions were restored to the normal and the other partly cured by deep digital massage, Würdemann[1] treated three recent cases: the first without effect; in the second the result was V. 6/vi; in the third no effect.

He speaks of the prognosis and mentions the various forms of treatment which have been used for this affection and considers that forcible massage seems to give the best results.

Abstracts are given of all the cases which could be found that were treated with massage; they were, including the writer's five cases, fifteen in number; in eight of these there seemed to have been partial or complete recoveries of vision. Success with this form of treatment is ascribed mainly to massage, which permits a flow of blood past the obstruction and keeps up the retinal nutrition until sufficient absorption of the clot has taken place. The treatment is energetic, but is well borne and no damage has been done. Its application is as follows: After instillation of two drops of 5 per cent. cocain or 1 per cent. holocain solution, a little vaselin is put into the eye; the operator stands in front of the patient, who is in a sitting or lying position; one hand is placed back of the patient's neck to steady the head, and the thumb of the other pressed deeply between the eyeball and the wall of the orbit, the lids being closed, almost dislocating or gouging out the eye. Then with a slow, rotary motion the thumb is passed round the eyeball, the pressure being suddenly released and then repeated. This procedure is kept up for five to ten minutes, until the patient can stand the pressure no longer and calls for its stoppage. The

(1) Amer. Jour. of Ophthal., January, 1906.

treatment is made three times a day at first, then twice, and then once daily. The largest number of such treatments was given in my last case, being ten in six days. In three of the cases half a dozen office treatments were given by the electric vibrator once a day, after digital massage had been stopped. He has recently been using suction vibrator attached to the Pynchon pump on the Victor electric apparatus, for the purpose of increasing the blood supply to the optic nerve and retina in cases of atrophy, and believe such would be applicable to the treatment of embolism and thrombosis.

All these patients had hot compresses one-half hour on every third hour during the day for the first week, from four to eight pilocarpin sweats, and large doses of the iodid of potash for several weeks, medication by iodids being continued for a month or more in smaller dosage. After the third or fourth treatment the eyeballs become tender to touch and can not be so forcibly rubbed, but in no case has any inflammation been produced, nor has dislocation of the lens or retina followed. Even if such an accident should occur, the risk is well worth the taking, as these cases are otherwise hopeless.

Improved Technic in the Implantation of an Eye after Enucleation. A full description of his method is given by Langrange.[1] After enucleation of the eyeball, *the eye of a rabbit is implanted into the empty Tenon's capsule.* The rabbit's eye must be from a young animal and should not be larger than the enucleated eye. The rabbit's eye is placed into Tenon's capsule with the cornea turned downward and then the several muscles of the patient's eye are sutured to the posterior pole of the rabbit's eye. Rolling up of the muscles can be prevented by flattening them out. This method of implantation should not be used after enucleation on account of iridocyclitis or panophthalmitis, where the capsule of Tenon is implicated in the process. The implanted eye shrinks in the course of time, but there usually remains enough of a stump for the artificial eye to facilitate its mobility. Out of 11 cases observed, 8 showed a very good result. The longest time of observation was 4 years.

(1) Wien. med. Wochenschr., April 2, 1906.

Operations on the Central Nervous System. Many Americans will remember the magnificent ocular fundus and other illustrations shown by Sir Victor Horsley in his address on surgery, delivered at the seventy-fourth annual meeting of the British Medical Association. He then stated that the skull and dura mater should be freely opened whenever optic neuritis accompanied intracranial disease, unless the neuritis is of anemic or toxemic origin. He placed considerable responsibility on the medical adviser if blindness results, after the process has been diagnosed, through failure to arrest it by the simple palliative remedy of opening the dura. The ophthalmoscopic appearance of the disc must be carefully interpreted before predicting the degree of vision after operation. The greater the secondary changes in the disc and retina as shown by yellowish white, stippled patches of exudation, or opal white atrophic changes, especially if associated with macular figures, the more will vision be impaired.

TOXIC AMBLYOPIA.

Methyl Alcohol Amaurosis. Although the Editor is satisfied that the Industrial Alcohol Bill will effectually check the rising tide of *death and blindness from the use of deodorized wood alcohol by substituting for it a cheaper, better and much less toxic agent,* yet it may be a year or so before the supply of this dangerous fluid is entirely consumed in the Arts. He is led to believe this because of two cases of methyl alcohol poisoning that have come under his observation since the passage of the Congressional enactment referred to. In a paper before the Ophthalmic Section of the British Medical Association[1] last Summer he reported quite a number of hitherto unpublished cases of the well known type—several cases of blindness from inhalation of the toxic fumes as well as examples of poisoning from other sources.

Perhaps the most interesting case of toxic amblyopia is that reported by Gifford under the caption, *An Unusual Case of Methyl Alcohol Poisoning.* The patient was, for about four hours, engaged in staining and shellacing the

(1) Brit. Med. Jour., Dec. 29, 1906.

inside of a closed room, 16x14x8. Wood alcohol formed a large part of the material he was using. Two hours after leaving the room he was absolutely blind. He was well in every other way. Perception of light began to return in a week. In three weeks he could read coarse print. Then began a change for the worse, and in six months he was practically blind again. Then another change for the better began (considered by Gifford[1] quite remarkable), and in the course of a year his vision was fingers at one foot in one eye and at six inches with the other, where it has remained. Optic discs atrophic, vessels small, one-third of the temporal half of the right field remains, and the temporal half with ten degrees of the center field is gone. His family physician examined him the day following the poisoning and found the patellar reflexes absent. This reflex returned in the course of a few months, and finally became normal. The author thinks the reflexes should be more carefully looked into in these cases. When wood alcohol is burned formaldehyd is generated and has been known to cause amblyopia of a transient form.

[It will be noted that it was the inhalation of *rebreathed air, charged with wood alcohol, in a confined space* that produced the amblyopia. Several of these cases of blindness from inhalation have recently occurred in Chicago. —Ed.]

The Effect of Formaldehyd (Formalin) Upon the Cornea. One drop of a 40 per cent. solution of formaldehyd was accidentally introduced into the eye of a patient. It was washed out with water within fifteen seconds. No pain experienced until six hours afterward, when the eye became very painful and much inflamed. For a number of days the lids and conjunctiva were edematous. The cornea was steamy. Six months later the patient was seen by Sager,[2] when it was found that the cornea was still slightly opaque, with vision reduced more than one-half.

Lesion of the Chorioid Due to Intestinal Inflammation from Ptomaine Poisoning. Bull[3] reports two cases. The

(1) Ophthalmic Record, June, 1906.
(2) The Ophthalmoscope, February, 1906.
(3) Trans. Am. Ophthalm. Soc., 1905.

first, a girl of 14, had been seriously ill with ptomaine poisoning; vomiting, diarrhea, increased temperature, rapid pulse and profound prostration and delirium. Large pemphigoid bullæ appeared on the trunk and extremities. Six weeks after the attack her eyes were examined. The pupils were dilated, iris immovable, and total paralysis of the accommodation. Optic nerves pale. Scattered all over the fundus of both eyes were patches of yellowish-white exudation in the chorioid of varying size and shape, very flat, with scarcely any elevation above the general fundus. They were in different stages. The older patches were surrounded by a reddish margin, but there were no pigment masses anywhere. There were no scotoma and no limitation of the field of vision. The ophthalmoscopic picture did not suggest syphilis and no history of it was obtained. The patient got well under iron, strychnia and arsenic. The second case was in a young lady of 27. The attack of poisoning was similar to the other. The eye findings, too, were quite the same as in the first case, with the addition of some faint peripheral striæ in both lenses. In this case also there was no hint of syphilis. She was at first put on mixed treatment, including inunctions, but owing to the anemia this was changed to iron and arsenic, which were given later with strychnia. This case also recovered; even the opacities in the lenses disappeared.

Report of a Case of Homatropin Poisoning. A highly neurotic woman was examined by S. H. Brown[1] for an error of refraction. Two drops of a 2 per cent. sol. homatropin were used to suspend the accommodation. The patient fainted before the examination was completed, then became delirious and incoherent. This condition continued for twenty-four hours.

[One of the advantages that flow from using in the form of gelatin discs such agents as are required to be applied to the conjunctival sac, is the freedom from toxic symptoms. After many years' use of homatropin and cocain discs I have never seen a single example of poisoning from them.—Ed.]

Action of Chrysarobin on the Eye. The affections of the eyes due to the action of chrysarobin, so far published,

(1) Annals of Ophthalmology, April, 1906.

were primary catarrhal inflammations of the conjunctiva, eventually secondary changes of the cornea. This is is corroborated by an observation of Krause.[1] In two other cases, however, the keratitis was primary. In one case it consisted in a ring-shaped opacity of the parenchyma, resembling the annular, central, vascular, parenchymatous keratitis, described by Vossius, but of more acute character. The opacities in the third case formed furrows in radial arrangement, and were similar to herpes. Whether these affections are characteristic of the action of chrysarobin, can only be decided by observations on a larger material.

Antipyrin Amaurosis Induced by One Hundred and Thirty Grains, Taken in Forty-eight Hours. A case of *amblyopia following the ingestion of one hundred and thirty grains of antipyrin*, taken in five-grain doses, the total amount being taken in forty-eight hours, is recorded by Hotz.[2] Forty-eight hours after the last dose there was total amblyopia. The patient was placed in a hospital and given pilocarpin sweats, colonic flushings and Blaud's pills. Ophthalmoscopic examination showed media clear, temporal half of disc pale and retinal vessels contracted. Vision improved and visual fields showed slight contraction with central scotomas. Six weeks after the onset of the amblyopia vision was normal, with normal fundi and normal fields for form and color.

So far only one case of *antipyrin-keratitis* has been published, by Mizu, Japan. It consisted of erosions at the center and lower lateral margin of the cornea, 3.5 and 2 mm. in diameter, which healed in a few days. Inouye's case[1] differed from this. A woman, aged 48, became affected with erythema, as soon as her skin was exposed to the sun. After taking antipyrin 0.8 at 10 a. m. and 1.00 at 3 p. m., her eyes commenced to swell and be painful at 8 p. m., so that she could not sleep the whole night. At the examination, two days later, the face was red and swollen, especially the upper lids, but the conjunctivæ were not hyperemic. Twenty-five small infiltrations were, close to the limbus, in the right cornea, 16 in the left. On

(1) Zeitschr. f. Augenheilk., p. 233, 1906.
(2) Archives of Ophthalmology, May, 1906.

oblique examination, the cornea looked as if dusted with bran; ophthalmoscopically the optic discs appeared distorted, and the keratoscopic pictures were very irregular. Vision right fingers at 1 m., vision left at 1½. The patient was very myopic. Under instillations of a 2 per cent. solution of dionin and applications of boric acid the pain subsided and the infiltrations were not noticeable on the second day.

From this experience, Inouye warns against the practice of some French oculists to dust antipyrin powder or instil solutions (1 to 25 per cent.) directly into the eye.

Argyrosis from Argyrol. Spengler,[1] while declaring the great value of argyrol in diseases of the lacrimal organs, warns against the danger of its entrance into the tissues through lesions of the mucous membrane, as it will lead to irreparable argyrosis.

[A correspondent wrote me recently regarding the use of argyrol in a burn of the palpebral conjunctiva. The conjunctival lesion became infected and he employed 20 per cent. argyrol. Since then the tissues have been deeply stained with the remedy. In another case argyrol was injected into the lacrimal sac; permanent argyrosis was the result.—Ed.]

OCULAR MUSCLES.

On the Lifting Power of the Adductors and Tensile Strength of the Recti. The exact amount of force which the external muscles of the eye exert, or, in other words, their lifting power, is the subject of experiment by Lucien Howe.[2] The following method was used: A small pair of forceps was attached to the conjunctiva grasping the tendon of the external rectus; a thread attached to the forceps passes over a roller and is connected with an open dish into which water is injected until the eye begins to move outward. When a person looks at an object directly in front, the force exerted, expressed in weight, averages 14 grams.

[The Editor particularly recommends the perusal of

(1) Zeitschr. f. Augenheilk., p. 441, 1906.
(2) Amer. Jour. of Ophthalmology, July, 1906.

Howe's exhaustive treatise on the ocular muscles, a work of which the foregoing observations form a part.]

Relations of the Superior and Inferior Recti Muscles to Convergent Squint. Our attention is by Jackson[1] drawn to the fact that advancement, like tenotomy, has its failures. *No operative treatment of convergent squint can be regarded as rational which does not attempt to correct abnormal contraction of the nasal fibers of the superior and inferior rectus* which come into play when the eye is strongly adducted. These muscles are accordingly to be considered as secondary abductors and adductors. Simple tenotomy increases their action by diminishing the power of the primary abductors and adductors, which tend to bring the eyeball into the primary position. In high degrees of convergent squint Jackson performs a partial tenotomy, dividing the inner nasal fibers of the upper and lower rectus. In very high degrees the extended tenotomy may be combined with advancement. A case is reported which shows the permanence of the results obtained by extended tenotomy.

A Secure, Looped, Single-Stitch Advancement Suture is described by Mark Stevenson.[2] With the advancement forceps grasping conjunctiva, capsule of Tenon, and muscle together, one of the needles is passed from without inward (toward the globe), through the conjunctiva, capsule, and junction of the middle and lower thirds of the tendon or muscle. The same needle is then passed outward (away from the eyeball) through the lower margin of the tendon or muscle, through the capsule and conjunctiva, and then is carried back (inward) through all three just behind the first point of entrance, forming a complete loop inclosing the lower third of the muscle or tendon and some of the capsule and conjunctiva. Next, after freeing the conjunctiva from the sclera, to within 4 or 5 mm. from the cornea, the needle is carried under the conjunctiva almost to the edge of the cornea and in the manner to be described shortly, is stitched deeply a little below the horizontal meridian, through the episcleral tissue into the sclera. The needle on the other end of the suture is likewise used, making a loop on the upper third of the tendon inclosing

(1) Jour. Amer. Med. Assoc., July 14, 1906.
(2) Ophthalmology, July, 1906.

some capsule and conjunctiva and also making an episcleral and scleralanchorage near the cornea and usually close to the other suture, then the two sutures are tied in the first part of a surgeon's knot. If the suture material is dry, no ointment having been applied in order that it may slip readily, it is better to make the first part of the knot with a single turn, so that the suture may be tightened more readily with less likelihood of breaking.

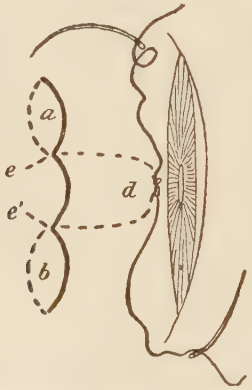


Fig. 14. Mark Stevenson's single-stitch suture for muscular advancement.

The suture now consists of two loops, one on the upper, the other on the lower third of the tendon or muscle. These loops are connected by a central crosspiece lying on the conjunctiva. Each loop is also connected to a separate anchorage in the sclera and the two ends of the suture are tied between the two anchorages in the sclera. It is sometimes sufficient to pass only one needle through the episcleral and scleral tissue, tying the suture as before. All superfluous tissue should be removed, only sufficient being left to hold the sutures and close the gap when the sutures are tied.

Observations on Operations for Advancing the Recti Muscles. The faults of Worth's, de Schweinitz's and Stevenson's operations are pointed out by Cogan.[1] The author

(1) Ophthalmic Record, August, 1906.

then describes a method of his own. Two sutures of No. 3 black silk, each eight inches long, well oiled, are armed with No. 2 curved patent eye needles at each end. A vertical incision is made about 7 mm. from the cornea over the site of the tendon through conjunctiva and capsule, the muscle exposed and elevated with strabismus hook. The advancement forceps are inserted, grasping

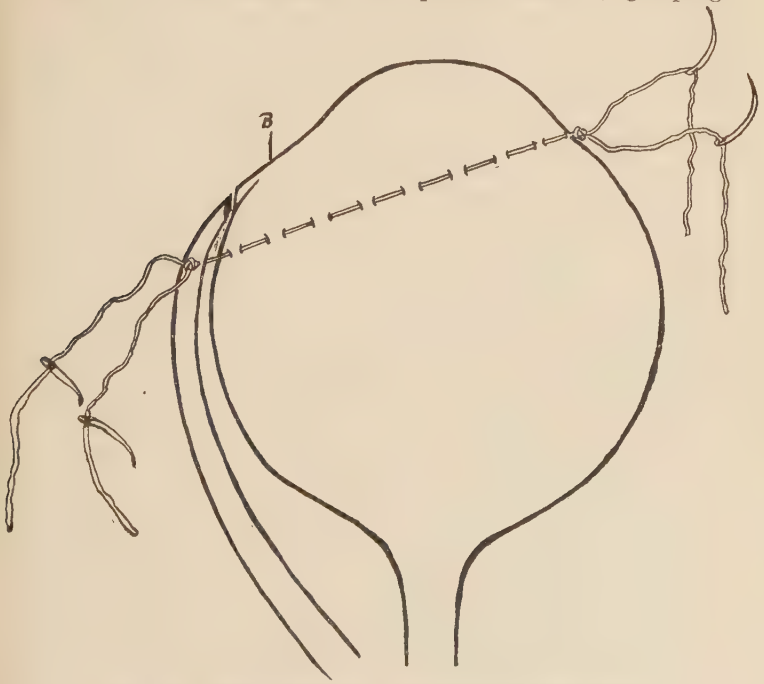


Fig. 15. Cogan's method of advancing an ocular tendon.

muscle, conjunctiva and capsule. The tendon is then severed from its attachment. One needle is passed through the conjunctiva, capsule and muscle and carried forward horizontally and made to take a deep scleral bite near the cornea. The other needle on the same suture is now passed through the conjunctiva, capsule and muscle below the entrance of the first needle, and is carried out under and back over the suture running from muscle to sclera

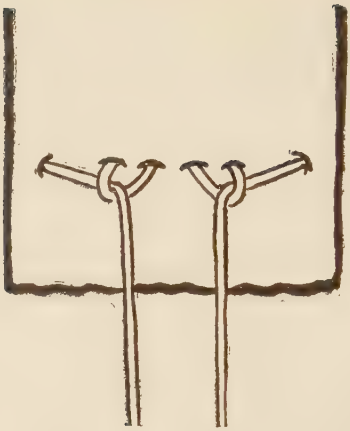


Fig. 16. Cogan's method of muscular advancement.

and is then re-entered through muscle, capsule and conjunctiva. This suture forms an adjustable loop on the under surface of the muscle. The same procedure is carried out on the lower third of the muscle. The muscle

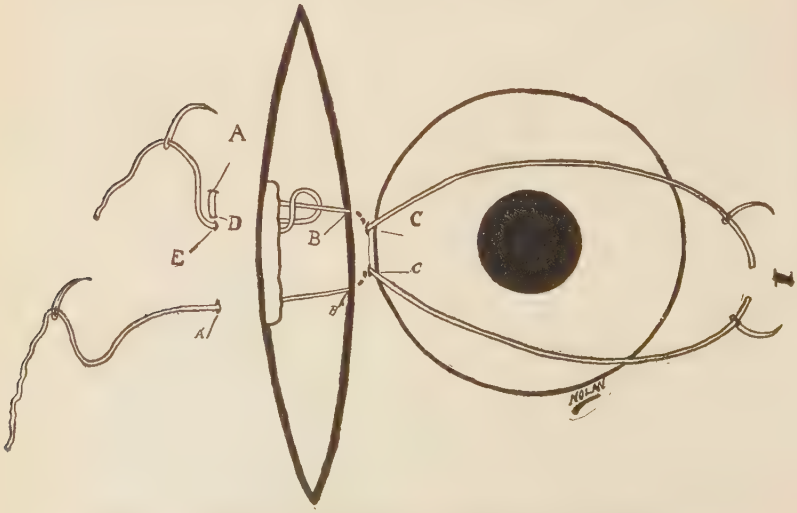


Fig. 17. Method of advancing an ocular tendon (Cogan).

sutures are then drawn up and tied. The muscle is advanced by pulling upon and tying the scleral sutures. The excess of muscle is then excised. The free ends of the muscle sutures are now tied to the free ends of the scleral sutures, thus forming a bandage to hold the tendon flat against the site for its new attachment.

[The author, Dr. J. E. Cogan, Cleveland, O., was kind enough to send the Editor an ingenious contrivance made of rubber and threads that fully illustrated his method. Doubtless any interested surgeon might obtain a similar favor by asking for it.]

Fixation of the External Rectus Muscle in Nystagmus and Paralysis. Nystagmus of congenital origin, not due to atypic development of the brain, may be improved, says Colburn,[1] in some cases, by the correction of an error of refraction and the addition of sufficient plus strength to allow of excessive convergence. When the error amounts to an exotropia, a strong plus glass before the fixing eye, and that eye strongly abducted, allows of a clearer vision with a minimum of oscillation. Noyes has reported good results from complete tenotomy of the internal recti. In most of the congenital or idiopathic cases which have come under his observation the position of greatest rest was that of marked abduction of the fixing eye, whether the refraction was plus or minus, and the effort to see most accurately was made in that position. Whatever may have been the refraction, the object to be seen was held as closely to the eye as possible, apparently with the purpose of diminishing the excursion of the image upon the retinal field. Nystagmus has disappeared in patients suffering from a high degree of error of refraction after wearing a full correction, even though in some cases the visual acuity remained far below the normal.

He refers to the operation for partial fixation of the globe for the improvement of vision in certain cases of nystagmus, reported by him in 1904, and describes this as follows: After complete cocain anesthesia the eye was placed in a central position by an assistant and a small wound was made in the conjunctiva at the temporal cul-de-sac for the purpose of marking its position. The eye was then rotated inward, the conjunctival cut enlarged

(1) American Journal of Ophthalmology, March, 1906.

and the muscle exposed. The external orbital-muscular checks are freely excised and the periosteum wounded. A double-armed suture was passed through the muscle, then deep into the periosteum and out into the conjunctival sac and tied. He now modifies the operation by carrying the suture out through the integument and tying over a plate tin button.

At the suggestion of Casey Wood he resorted to this operation in two cases of paralysis following injury with good cosmetic effect. He adds that his limited experience with the operation for the improvement of vision in case ot nystagmus leads him to consider it favorably. The cosmetic effect in suitable cases is all that can be desired. In paralysis of the ocular muscles or any set of them, it is certainly more desirable than the operation of exsection, and more satisfactory than the advancement of the paralyzed muscle without fixation.

The Surgical Treatment of Ptosis. A modification of the operation of Wolfe is preferred by Thompson[1] of New York. An incision is made through the skin parallel to and extending the full length of the upper tarsal margin. The skin is then dissected from the underlying parts, downward to the lid margin and upward to the brow. Vertical incisions are made through the orbicularis on either side of the levator, and this strip of orbicularis removed. The levator is now separated from the conjunctiva as far back as possible. The tendon is grasped and severed from its tarsal attachment. From $1\frac{1}{2}$ to 3 mm. of it is excised, and then reattached by mattress sutures to the tarsus near its ciliary margin. Silk is used for the suturing. The skin wound is closed after a small strip of skin is removed and the part covered with a dry dressing. The author claims that this operation works well even in the presence of an atrophic muscle, and that it is especially indicated in monocular ptosis. Some of his cases are two years old and no recurrence of the ptosis has taken place.

The Fergus Operation for Ptosis has been successfully and satisfactorily performed by H. W. Woodruff[2] three times. It consists in exposing the frontalis muscle through

(1) Annals of Ophthalmology, October, 1905.
(2) Ophthalmic Record, September, 1906.

a brow incision and bringing down a tongue from this muscle and fastening it to the tarsus and then closing the skin wound. No scar results. The lid is elevated by the action of the frontalis muscle without deformity of the external parts.

ORBIT AND NEIGHBORING CAVITIES.

One of the most interesting accounts of large foreign bodies in the orbit since Gifford's classic paper on that subject in the *Ophthalmic Record* is given by C. H. Baker.[1] A part of the extractor spring of a Winchester rifle was driven through the eyeball into the orbit from the explosion of the rifle. The eye became shrunken and was enucleated a month after the injury because of evidences of sympathetic trouble in the fellow eye. The presence of a foreign body in the orbit was not suspected and came as a surprise during the enucleation. It was found to have penetrated the roof of the orbit and was firmly fixed, great force being required to extract it. It was one and a quarter inches long and one-eighth inch square.

The History of a Foreign Body Retained in the Orbit for Nearly Four Years is furnished by Packley.[2] In May, 1902, while at play, a small boy was knocked against a rail fence and fell with another boy on top of him. Immediately afterwards he pulled a splinter of hard-wood "out of his right eye." There was only trifling bleeding. For two days afterwards had headache and occasional retching. On recovering from the momentary concussion he discovered he had no perception of light in the right eye, and that the ball had protruded somewhat. When first seen, eight days after accident, the right eye was proptosed, and there was a small cicatrix on cheek below and slightly to the nasal side of the eye. Tenderness on pressure in the orbit below the eye, not elsewhere; there was an offensive smell from the eye. Ophthalmoscope showed great swelling and tortuosity of the veins near the disc. A conjunctival incision was made midway between the inferior oblique and inferior rectus, and in exploring through this

(1) Ophthalmic Record, May, 1906.
(2) Australian Medical Gazette, June, 1906.

incision, a hardwood splinter, ¾-inch long and 3/16-inch thick, was drawn out with forceps. Careful probing revealed no other foreign body. There was little pus around the foreign body, but the wound was cleaned and left open with gauze drain for a few days.

A week later the eye had gone back nearly to its normal position. No pain or tenderness on pressing back into the orbit. Optic neuritis much more marked. No light perception. Disc eventually passed into a condition of white atrophy, and when last seen a few weeks after the accident. the eye was quite normal in position and movement, and no pain or tenderness.

Four years later patient's mother brought in specimen No. 2, a piece of wood 1¼ inches long and ⅛ inch thick, which the boy had found "sticking out of the corner of his eye" on waking, a few days before. There had been no pain or swelling previously, and nothing had been noticed when he went to bed the night before. The dentations on the end of the second piece exactly fitted those on the end of the first piece.

Cases are on record of large foreign bodies being lodged in the orbit for some time without the patient's being aware of it, but not for so long a period as nearly four years. If a foreign body be aseptic and causes no inconvenience for some weeks, there is no reason why it should not remain for an indefinite period. In this case, however, the foreign body was septic, and caused suppuration, and yet after removal of the first piece the remaining portion lay quiet for years.

Dermoids of the Orbit. The history of a case of this affection is given by Pollock[1] in which the tumor was removed without any difficulty; the findings of the microscopic examination are mentioned, the contents of the cyst having been mainly sebaceous material with a few cells and a number of loose hairs.

The writer discusses various peculiarities of these congenital growths. They occur in three situations: (1) most frequently at the upper and outer angle of the orbit, (2) less frequently at the upper and inner angle of the orbit, and (3) in the upper eyelid. While small, they seldom give rise to pain or inconvenience, apart from

(1) Ophthalmic Review, June, 1906.

disfigurement; the skin is movable, but the cysts may be attached to deeper structures; some of these adhesions may be congenital, others are probably inflammatory. The cysts are usually opaque, but may be translucent.

Histologically, dermoids are characterized by a cyst wall resembling the skin, with a lining membrane simulating epidermis and under it hair follicles and glands. Mitvalsky divides them into three classes, according to the structures of the walls: (1) with hair follicles, sebaceous and sweat glands, (2) with sweat glands, (3) with simple epithelium and no hair follicles or glands.

Operation for the Relief of Cicatricial Orbit. Two cases are reported by Ball[1] in which Maxwell's operation was performed with successful results. Before the operations artificial eyes could not be worn, but after, the orbits retained large artificial eyes. The operation consists in making a lower cul-de-sac of the loose skin of the lower lid. In addition to the Maxwell operation it was necessary to use skin grafts to restore the upper cul-de-sac.

On Some Ocular Symptoms Common to or Produced by Affections of the Nose and Accessary Cavities. *Headache.*—In spite of all that has been written on the subject Casey Wood[2] believes that the differential diagnosis between headache due entirely to neighboring cavity affections and that due to eye diseases alone has not been clearly established. Glasses have been prescribed and other eye treatment given for the relief of a frontal headache subsequently shown to be due to ethmoidal disease or infection of the frontal or other accessory sinus. *Per contra,* it is not infrequently observed that only after making the devious nasal passage straight or after resorting in vain to other remedial measures does the rhinologist suspect that his patient's uncured headache may be due to eye-strain. While evident defects in the ocular refraction or a decided lack of balance in the eye muscles (or both together), or the presence of a painful disease of either eye may properly give rise to suspicion that the diseased organ is responsible for the headache, it must be remembered that the character, site and other peculiarities of the head pains greatly assist in a diagnosis and help us to a conclusion

(1) Annals of Ophthalmology, October, 1905.
(2) Ophthalmology, January, 1907.

as to their true character. In other words, while the actual alterations in the tissues and abnormality of function must ever be the chief guides in the differential diagnosis of neighboring sinus and ocular headache, the *clinical evidence* is of extreme value and must not be neglected. This is all the more true because in reflex headache the underlying nervous state is of just as much importance as the gross pathological changes in producing these symptoms. Inasmuch as the proportion of ideally perfect nasal cavities or perfectly normal eyes is small, in the presence of headache one cannot always judge from the local conditions alone whether he is dealing with a patient in whom an unstable nervous system is reacting to an otherwise insignificant irritant in the form of a slight nasal or ocular defect, or whether the headache arises from quite another cause. The following clinical picture of the usual form of ocular headache will serve to emphasize this point. *Ocular headache from eye-strain is almost invariably bilateral; it is rarely severe or accompanied by nausea or vomiting, and it is practically always a daylight headache.* It does not keep the patient awake at night, because when the lights are turned out there is no use made of the eyes. There is no eye-strain and consequently no reflex pains. *Head pains from eye defects are almost invariably frontal, temporal or occipito-frontal.* Vertical or general headache or pains confined to one side of the head or to the occiput or nuchal region alone or very severe acute pain in any part of the head is probably not of ocular origin.

True eye headache generally follows or is, at least, associated with other eye signs and symptoms. There is a hyperopic astigmatism or some other irritating form of refractive error, some anomaly of accommodation or some marked extrinsic muscular imbalance. Headaches from eye-strain generally follow prolonged and continuous use of the eyes for near work, such as reading, sewing, writing, china painting, etc.

Much use of the eyes in the distance brings about a similar result. An ocular headache is often the aftermath of a shopping excursion, a railway journey or a visit to the theater. Headache from eye-strain is often accompanied by pain in the eyes themselves, redness of the ocular and

palpebral conjunctivæ, blepharitis, catarrhal discharge and other evident signs of ocular involvement.

It must not be assumed from the foregoing that ocular pains and headaches are always due entirely to the eye defects or entirely to diseases of the nasal and accessory cavities. On the contrary, it should ever be borne in mind that the headache primarily set up by an uncorrected astigmatism may be aggravated or precipitated by a nasal "cold" or by the nervous irritation of an infected sinus. In other words, there is such a condition as a mixed, naso-ocular headache.

Vertigo.—That dizziness may be set up both by affections of the accessory sinuses and by ocular defects is a fact frequently referred to by authors, but the differential diagnosis of this symptom has been insufficiently discussed. The diseases of the ocular apparatus generally responsible for it are the heterophorias and heterotropias of a paretic character. The vertigo that so often results from paralysis or paresis of the extraocular muscular requires little knowledge and, at most, a superficial examination to determine its exact nature. On the other hand, the etiology of that troublesome, if temporary, dizziness accompanying the ocular imbalance that wavers between a heterophoria and a heterotropia is less readily referred to its proper origin and may easily be regarded as a nasal reflex or attributed to other causes.

Because of this difficulty in diagnosis it may be well to draw a clinical picture of ocular vertigo. Ocular vertigo rarely if ever occurs unless both eyes are used (or an attempt is made to use them) at the same time. Patients are sometimes conscious of this, and in crowded thoroughfares, or when compelled to use their eyes for some time in steady fixation, or are suddenly called upon to see distinctly, close one eye. This generally relieves or prevents vertigo and the diplopia that so often accompanies it.

The fact that double vision is very often of so evanescent a character as to be barely recognizable as such by the patient, is a common co-reflex of vertigo, is made use of in establishing its ocular character. The means of detecting the amount and kind of heterophoria or heterotropia are so well known to ophthalmologists that it is hardly worth while to say aught about them here. A rough

though effective test and one readily applied by the rhinologist is that with the *red glass*. The patient sits in a semi-darkened room, squarely facing a candle light from ten to twenty feet away. Cover one eye and place over the other a piece of dark red glass, thus directing his attention to the sort of image he should see with the uncovered eye through the tinted glass. The red image, of course, corresponds to the eye over which the tinted glass is placed; the ordinary candle flame to the other eye. Now uncover the second eye; if his eye-muscle balance is good he should see a single pink light—an image composed of the red rays of one eye and the clear light of the other eye. If there is a marked tendency to diplopia he will see two lights—one red, one white—and their distance apart, relative position, tendency to approach or to further separate, etc., will give a fairly accurate notion of their degree and other characters. If there be no tendency in the two images to separate, and the single pink light continues to be seen for several minutes, the patient's vertigo is probably not due to oculo-muscular defects.

An aid to the diagnosis of ocular vertigo is the history of other eye symptoms. Frequently such patients complain of blurring of print in reading or that the letters and lines run together and get mixed up—experiences that are probably a sort of transient diplopia at the near point. They are also prone to complain of "panorama" headache (brought on by shopping, railroad journeys, attendance at theaters and the like), of car sickness and of photophobia. They are often relieved by the correction of an irritating hypermetropia or an astigmatism. If so, the remedy acts by relieving the associated muscular defect upon which the vertigo throws some light on its origin, although it does not often distinguish ocular vertigo from other forms of these symptoms.

The words "confusion" and "uncertainty" describe many examples of dizziness arising from oculo-muscular anomalies. The vertigo is rarely so marked that the patient staggers or falls. Moreover, vertigo from ocular defects is plainly the result of attempting to use the eyes. It almost never comes on while the patient lies in bed or is sitting quietly; he usually experiences it while walking in a crowded street or doing something associated with move-

ment of objects or while rotating the eye-balls and at the same time using his accommodation.

Lacrimation.—Probably an *increased flow of tears is more often a sign of nasal than ophthalmic infection,* or, to put it more concisely, the ocular irritation that results in the overproduction of tears or their insufficient drainage, or both, quite commonly originates in nasal disease. This is true even of those cases where organic changes are present in the lids, about the *puncta lachrymalia*. canaliculi, tear sac or nasal duct. In all instances of chronic lacrimitis especially, the nasal passages should be carefully inspected and any abnormalities likely to damage the lacrimal apparatus should be treated.

Of organic lesions resulting from nasal and accessory sinus disease it is impossible to speak in full detail. It has, however, been well established that, apart from orbital abscess and optic atrophy due to spread of infection from the ethmoidal cells or to bursting of an abscess originating in the frontal or maxillary sinus, numerous diseases of the eyelids, conjunctivæ, oculo-lacrimal apparatus, cornea, orbital muscles and even of the choroid have been produced by nasal disorders.

Diseases of the lids are not only associated with affections of the nose and neighboring cavities, but they are sometimes directly the result of a sinusitis. A unilateral edema of the lids—most marked in the morning and aggravated by acute exacerbations of the chronic sinusitis upon which it depends—constitutes a very obstinate symptom until its true character is recognized and the cause removed. This nasal form of blepharitis often appears as a part of conjunctival follisulitis which persists unless the sinus implication is recognized and properly treated.

Perhaps *the most interesting of all the ophthalmic sequels of accessory sinus infections and affections are pareses and paralyses of the extraocular muscles.* About the occurrence of these there can be no doubt. The ophthalmologist should hesitate to label either of them "rheumatic" or "syphilitic" or "idiopathic" until he is assured that his patient is not a sufferer from sphenoidal or ethmoidal diseases and that either of these affections, if present, has been adequately treated. The immediate cause of ocular pareses in nasal cases is probably a peripheral infec-

tion of the nerve filaments supplied to the muscles involved. This infection may take place both in purulent and simple catarrhal infections of the contiguous cavities.

On the Frequency of Blindness Due to Disease of the Accessory Sinuses. Fish[1] contends that accessory sinus disease is the chief cause of idiopathic or obscure ocular disease and that many cases of partial or total blindness could be rescued if the accessory sinuses were properly looked after in every case instead of being so very rarely thought of. He cites three cases of corneal lesions cured by a restoration of normal circulation through drainage of the sinuses.

The writer also refers to three cases of involvement of the extraocular muscles due to sinusitis and claims that in literature there are 30 sinus cases showing oculomuscular affections, exclusive of those with total fixation of the globe from enormous edema. He cites two cases to illustrate an intraocular, circulatory disturbance due to the same cause and relieved by a sinus treatment.

He claims to have treated three patients with glaucoma, each traceable to sinusitis; the history of one case is given, showing an apparent cure after the removal of polypi and hypertrophied tissue from the nose.

Cerebral and Ophthalmic Complications of Sphenoidal Sinusitis. The fact that intracranial complications often arise from nasal suppuration is pointed out by St. Clair Thomson.[2] We have only to recollect the frequency with which pus is met with in the nasal accessory cavities at post-mortem examinations to prepare us for the possibility of this association being more frequently demonstrated, when the accessory sinuses of the nose are systematically examined in all post-mortem examinations with intracranial inflammatory lesions.

Post-mortem observation of a number of authorities shows that sinus disease is found in 30 per cent. of all subjects coming to the dead house, and many statistics agree that the sphenoidal sinus is, next to the maxillary, the most frequently diseased.

The writer gives the history of 2 cases in which the sphenoidal origin of intracranial suppuration is fully estab-

(1) Amer. Jour. of Surgery, September, 1906.
(2) Brit. Med. Jour., Sept. 29, 1906.

lished. He has made a search through literature for cases of cerebral infection from sphenoidal suppuration, the first effort in English to demonstrate that such a sequel is not uncommon, and has found 40 cases, in addition to the 2 just published, in which death ensued from intracranial complications as a result of septic infection from the sphenoidal sinus. These fall under the following headings: meningitis, 17 cases; thrombosis of the cavernous sinus, 4 cases; thrombosis and meningitis, 13 cases; miscellaneous, 8 cases.

The eye symptoms of thrombosis of the cavernous sinus often set in early, indeed the possibility of this affection being usually suggested by the condition of the eyes. The three chief ophthalmic changes are (a) papillary edema, (b) chemosis, and (c) exophthalmos. They develop within 6 to 16 days from the onset of symptoms indicating spread of the infection. It is possible that neither proptosis nor chemosis may occur in a rapidly fatal case, yet both were noted in 14 cases. These two symptoms may be present on both sides when first noticed, but they generally start on one side and develop in the other from one to six days later. There may be anesthesia, or ulceration of the conjunctiva, or opacity of the cornea. Paralysis of the ocular muscles generally occurs.

The condition of the pupils varies. They may be normal, unequal, small and not reacting to light, dilated and not reacting, or, in medium dilatation, with only slight oscillation. The fundus may be normal in rapid cases or at the commencement. Later on there may be congestion of the retinal veins, papillary stasis, papillary edema, papillary atrophy, or optic neuritis. The absence of papillitis or of swelling or neuritis has been observed. It is difficult in most cases to test the vision; it may be good or there may be complete blindness. Tenderness of the eyeball may also be met with

GLAUCOMA.

Hemorrhagic Glaucoma in a Young Patient. Glaucoma in the young has always been a matter of interest for clinicians, the effect of age being predominant in the etiology of this disease. It is exceptional that glaucoma is met with in young persons, and when observed it is an interest-

ing fact to note, according to Dujardin,[1] that in the majority of instances such eyes are myopic, the reverse being the case in senile glaucoma. Hemorrhagic glaucoma in the young may be found in ophthalmic literature, although the cases are rarely reported under this denomination, perhaps for the reason that most frequently they are of an incomplete clinical picture when compared with glaucoma in those of more advanced life. The case reported was in a young man of 28 years, who consulted Dujardin in June, 1906, in regard to the right eye. Vision was much lessened. The sight of the left eye was lost several years previously and it exhibited all the conditions of absolute glaucoma except that it was painless. The right eye presented the characteristics of typical hemorrhagic glaucoma; the iris had lost its bright aspect, the vessels on its surface made red streaks; the pupillary edge was of a brownish-red hue; the cornea cloudy, though not so much so as to preclude observation of the fundus. The optic nerve was deeply excavated and the vessels of the disc emerged from near the nasal edge. In the equatorial region near the ora serrata were several hemorrhages. The intraocular tension was increased; the pupil was dilated; vision 1/6; eye painful, with the pain extending over the course of trigeminal nerve. Darier attributes retinal apoplexy in young people to rupture following excessive dilatation of the vessels.

Posterior Sclerotomy as a Preliminary to Iridectomy in Acute Glaucoma. Preliminary sclerotomy in selected cases of glaucoma is advised by Arnold Knapp,[2] who reports the results in 7 cases operated on by him. He considers a posterior sclerotomy indicated in those cases of primary acute glaucoma or chronic glaucoma during an inflammatory attack where the eye is very hard and the anterior chamber so shallow as not to permit a satisfactory incision. He adopts the method described by Priestly Smith of turning the eye inward, exposing the outer surface of the sclera and puncturing it with a cataract knife so that vitreous escapes. The eye immediately becomes soft and the anterior chamber deepens. The ordinary iridectomy then follows. In one case operated on by the author an intra-

(1) La Clinique Ophtalmologique, September, 1906.
(2) Archives of Ophthalmology, July, 1906.

ocular hemorrhage occurred, but he thinks it would have occurred if sclerotomy had not been done, as the eye was a degenerate one. Knapp believes that the preliminary reduction of tension is a great aid to a proper corneal section and a satisfactory coloboma.

The Treatment of Glaucoma by High-Frequency Currents. The lowering of arterial tension under the influence of autoconduction is, according to Truc,[1] among the numerous physiologic effects of high-frequency currents. This important fact given by d'Arsonval at the commencement of his researches, and confirmed by many experiments, allowed Moutier to institute autoconduction as a special means of treatment in hypertension, and the latter has obtained happy results from the employment of high-frequency currents under the form of autoconduction—results which have been confirmed by others. The author has used these high-frequency currents in cases of hypertension under his care in tinnitus aurium; will it, he asks, be possible also by high-frequency currents to lower general arterial tension so as also to reduce intraocular pressure? The results in the following case seem to demand a reply in the affirmative:

The patient was 70 years old, of good health; vision had been excellent; never had had any eye disease; had arthritic troubles and arteriosclerosis; heart and lungs in good condition; urine normal. Following some excessive cerebral and ocular work for six months, patient began to have trouble in his left eye, and consulted the author May 12, 1906. Right eye normal; left eye vision 1/50; tension + ½. There were small macular and perimacular hemorrhages. The treatment was iodobromids, alkaline waters, pilocarpin, and a diet of milk and vegetables. Eight days later general condition was same; tension in each eye was + 1. Pilocarpin for both eyes morning and evening; purgatives, etc. At the end of May the condition was grave. quantitative; right, less hard (T + 1) and vision normal. An iridectomy was done on left eye June 13, 1906, without incident; but in spite of this the eye remained hard and without qualitative vision. There were no operative com-

(1) Revue Générale d'Ophtalmologie, August, 1906.

plications save a hyphemia of 3 millimeters; wound healed in five days but with vision nil and T + 3.

The author applied the currents in eleven cases of from three to fifteen minutes. A table is given showing the lessening of arterial tension through the eleven sittings, from the first at 27 to 17½ at the eleventh—the sphygmomanometer of Potain being used. The treatment was well borne. Locally the effect was to lower the tension in each eye, especially that of the left, and vision returned in it so that fingers could be counted at a few meters. The general health was improving when last seen, as was also the vision.

[Although the status of high-frequency currents in the treatment of eye symptoms due to organic lesions of the external ocular apparatus is as yet undecided, yet the observations of Würdemann and others are sufficiently definite to encourage one to employ them in grave cases unrelieved by other remedies.—Ed.]

Unsuccessful Excision of the Superior Cervical Ganglion in Inflammatory Glaucoma. Mrs. A., aged 48, was first seen by Foster[1] in December, 1903. She then had all the symptoms of glaucoma in each eye, but vision was good with her refraction corrected. The only symptoms she had ever had of possible increased tension were occasional halos around lights. She was seen by Foster again in June, 1904. Her condition remained unchanged, except that the right field was possibly a trifle smaller. On the 30th of the month a small foreign body was removed from the cornea of her right eye. On July 5th the tension was found to be increased. The next day there was ciliary injection with plus tension of both eyes, and an iridectomy was performed on each. The left eye went on to uninterrupted recovery and has never given further trouble. On the third day the right eye passed into a state of acute glaucoma. Eserin did not control the tension, and a few days later another iridectomy was performed. This did not relieve the tension, but did relieve the pain. Eserin was resumed, but exaggerated the symptoms rather than relieved them. A month later the superior cervical sympathetic ganglion on the right side was removed. The effects

(1) Annals of Ophthalmology, October, 1905.

of this operation were slow in developing, but in a month's time the tension was normal and all inflammatory symptoms had previously disappeared. V = pl. By March the V = O. By April 27 the eye was hard and painful and was enucleated.

OCULAR INJURIES.

Ocular Injuries from Glass and Stone. Sweet[1] remarks that since "glass and stone offer so little resistance to the passage of the Roentgen rays that a general belief exists that it is impossible to demonstrate, by means of radiographs, the presence of either of these substances in the

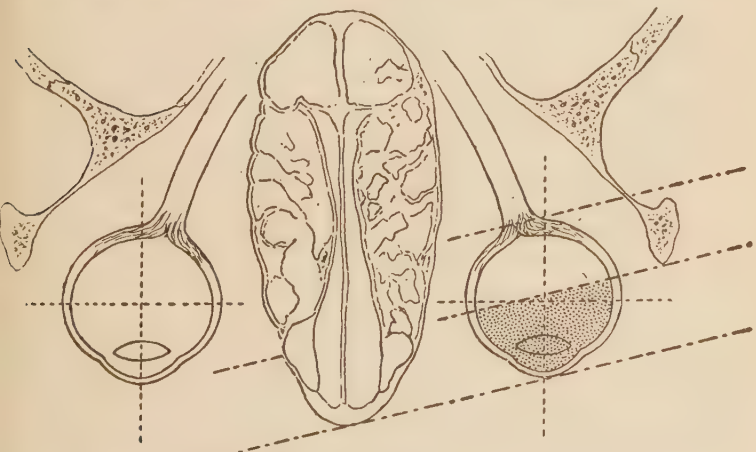


Fig. 18. External orbital margin 10 mm. back of corneal summit. Dotted areas in eyeball show passage of rays. Uninterrupted by dense orbital bones (Sweet).

eyeball in instances in which penetration is suspected." Moreover, the tendency of glass to splinter and of stone to break into small pieces further increase the difficulty of localization and make it impossible for the x-ray operator, even if successful in shadowing one or more particles, to positively state that the eye does not contain other frag-

(1) Opthalmology, July, 1906.

ments too small to be shown by the radiographs. Nevertheless, the author gives his experiences of a number of cases exhibiting penetrating injuries from various non-metallic substances, compares their radiographs with those furnished by steel and other metals and gives us illustrations reproduced in this volume. The legend beneath each picture indicates its purpose. Sweet also draws our attention to the fact that particles of glass or stone situated in the posterior part of the eyeball will present greater difficulties in localization, owing to the uncertainty of

Fig. 19. External orbital margin 10 mm. back of corneal summit. Anterior half of eyeball radiographed on plate free of orbital bones (Sweet).

securing a shadow of the body in a position of the orbit in which a differentiation may be made from the shadow of the dense bony structures in this situation. The position of the eyeball in reference to the external orbital margin and to the thin plate of bone back of this situation will determine the direction the rays must take in the endeavor to shadow the structures of the eyeball free from the denser portions of the orbital walls.

Injuries to the Eye with Birdshot. Two case histories of this interesting form of ocular traumatism are reported by Marple,[1] who reviews the literature in detail, in the

(1) Jour. Amer. Med. Assoc., Aug. 11, 1906.

light of recent advance in diagnostic methods, particularly x-ray localization. Marple's cases were both double perforations of the globe, which is not infrequent in birdshot injuries. Eight or ten cases are reported in which this condition was found ophthalmoscopically or on enucleation, and should be suspected whenever other shot penetrate to a considerable depth in the face or body, where there is paralysis of the ocular muscles, or retrobulbar hemorrhage with exophthalmos, provided always that a second shot had not entered the orbit without going through the eye. Such a condition has been observed, and could not be excluded before the advent of the x-ray localization. There is no question but that a considerable number of eyes have been removed quite unnecessarily in cases in which, on enucleation, no shot was found in the globe, but a second perforation through the sclera behind. Gengnagel reports a case in which there was double perforation of the cornea, the shot entering in the lower temporal quadrant and passing out at the nasal limbus, with prolapse of iris in both wounds. A number of cases are on record of immediate and permanent blindness after the injury, followed in some weeks by signs of atrophy, due to direct laceration of the nerve back of the central retinal vessels.

Fornatola reported 22 cases, in only one of which enucleation became necessary. He experimented with infected shot fired into gelatin which remained sterile. If the lids are clean and the globe be protected from subsequent infection from without, there is probability of the shot becoming encapsulated and remaining quiescent. The heat of the exploding powder and the friction of the discharge are sufficient to destroy all organisms on the shot except anthrax spores. Protection of the eye is the first and most important step in treatment. The conjunctival sac should be cleansed if the lids permit it and a bandage applied. Prolapsed iris would be excised, of course, ice applications made if there is much swelling externally, conjunctival sutures passed if there is a gaping sclera or corneal wound, and the patient kept in bed until it is healed. A probe should never be introduced into the wound. An accurate x-ray picture should be taken as soon as possible and absorption of intraocular hemorrhage assisted by the iodids

and the other usual treatment. If the shot is accessible, an attempt may be made to get it out, but if it is localized in the vitreous or out of reach elsewhere, it is best left alone, and often becomes encapsulated. If it causes irritation, an attempt can be made to remove it, and, this failing, the eye enucleated.

[The Editor ventured some years ago, in a paper on the subject, the same explanation given by Marple to account for the absence of septic infection in even severe gunshot wounds of the globe. He still believes that Marple is correct in his explanation of their lessened liability to be followed by migratory ophthalmia.]

Compensation for Injuries to the Eye. The question of *compensation and fitness for work after ocular injuries* being still in an unsatisfactory state, Sym[1] believes that trades should be investigated and classified according to the amount of sight required for the proper performance of the work. He believes that the formulæ suggested by Magnus and Würdemann for mathematical calculation of the degrees of loss sustained when vision is reduced to such and such a degree, when hemianopsia is produced, when paralysis of one of the ocular muscles is present, etc., are attempts at the impossible, because they involve so many assumptions and such purely arbitrary allowances for this and that injury, and will never, therefore, command the allegiance of the profession, and still less than of the law.

His suggestions are: (1) That there should be drawn up a list of trades classified according to the amount of vision, and more especially of near vision, absolutely required for each. (2) That each skilled workman should have a health ticket showing (besides such matters as, *e. g.*, that he was operated on for appendicitis or has lost one and a half fingers on his left hand) the actual state of his vision. Any employer who accepts a worker without this will, of course, expose himself to extra risks. (3) That for loss of an eye (leg, etc.), such and such a proportion of wages, paid as an annuity or commuted for a lump sum, should be the acknowledged compensation without the necessity of a legal process. For a man belonging to a trade for which binocular vision is not an absolute requisite this would form the compensation for injury; where

(1) The Ophthalmic Review, October, 1906.

the nature of his occupation does not absolutely demand binocular vision this sum would have to be allowed for in fixing the total award. He believes that were these points agreed upon there would be less speculative, wasteful and not always honest litigation, and less opportunity for that unfortunate conflict of medical evidence which brings so much discredit upon the profession.

Injuries of the Eye from Electric Short Circuit. A man, aged 30, received by short circuit a current of 500 volts, followed by perception of intense flashes in his eyes and loss of consciousness for a short while. After recovering he noticed impairment of sight, which passed away in a few days; the left eye, however, which had been nearest to the electric contact, was very sensitive to all kinds of light. About four months later, sight failed in left eye, especially upward. V. = 6/L. White, yellow and black spots were observed by Lunsgaard[1] in a horizontal, slightly curved stripe from the pale disc toward the temple, and at various places of the fundus whitish thin lines like retinal folds. Central scotoma. V. F. upward was contracted from 25° to 30°. After two months a constantly spreading detachment of the lower portion of the retina was ascertained, and the patient frequently suffered from headaches.

In the second case, a man, aged 35, the exposure to the short circuit was followed by burned cilia, slight erythema, peeling of the skin of lids and cheeks, lacrimation and a central opacity of right cornea, which had not disappeared when seen two weeks after the injury. The affection of the cornea is of especial interest, as it is very rarely caused by electric discharge.

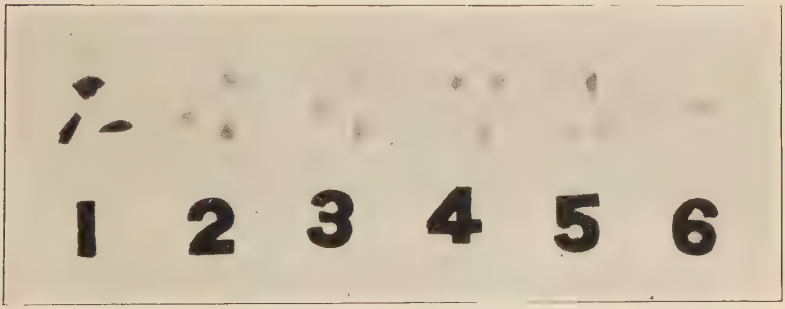
Traumatic Enophthalmos. Lukens[2] has reported one of these rather rare cases and has been able to find in the literature 78 examples which he has carefully tabulated. The following is a description of his own case. Patient, aged 54, had been stabbed 3 times in the face with a knife, after which he had been thrown down stairs. On examination the same day both lids of the left eye were slightly swollen, but very prominent; the patient had no control over them. The orbital tissues were tense and

(1) Klin. Monatsbl. f. Augenheilk., p. 501, 1906.
(2) Ophthalmology, July, 1906.

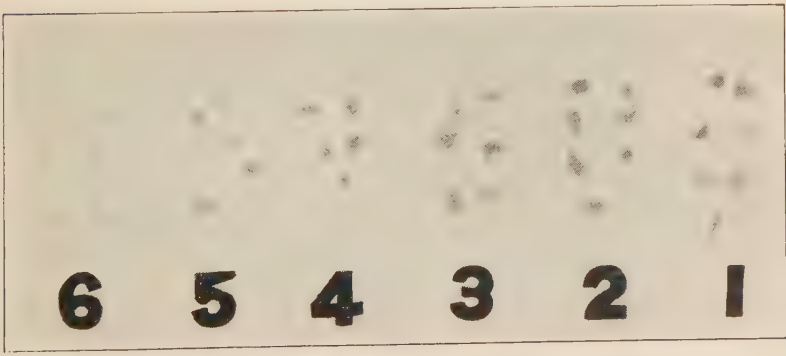
there was marked exophthalmos. The upper lid presented on its external surface an incised wound of perhaps 1 cm. in length, which was agglutinated and nicely held by the sutures applied the night before. On its under surface on either side of the middle third were two transverse cuts extending up through the cul-de-sac. These latter wounds were gaping. On exposing the cornea, which was done with great difficulty, owing to enormous chemosis, it was found to be uninjured. The anterior chamber was normal or a trifle shallow, the pupil was central, round and about 2 mm. in diameter and the iris was bright. The vision was roughly taken and was greatly reduced, recognizing finger movements. There was no evidence of contusions or wounds about the face other than the three stabs above noted. In addition to rupturing an artery, a fracture of the orbit, communicating with an accessory sinus, had been produced as evidenced by bleeding from the nose, which persisted for ten days. He was placed abed, iced cloths, boric wash and atropin were used. The violent orbital disturbance was soon greatly relieved, and he left the hospital on his own responsibility at the end of two or three days.

He was not seen again until June 4, 1904. Examination then revealed the following conditions: The left upper eyelid drooped, nearly covering the eyeball, cicatrization had taken place at the site of the conjunctival wound, partially obliterating the superior cul-de-sac, and the lid at the junction of its middle and outer thirds was slightly furrowed and drawn up and in, producing a tendency to entropion. The levator action of the lid was very feeble. The eyeball was dislocated 5 or 6 mm. back of its normal position and also 2 or 3 mm. below it, and the eye was rotated up about 30° and out about 20°. Upon palpation the eye was found to be firmly held in this position by a resistant mass extending from the eyeball to the floor of the orbit. No deep bands of cicatrization could be detected at the site of the injury in the roof of the orbit. The patient could rotate his eye about 10° in the horizontal meridian and not over 5° in the vertical. The pupil of the eye was about 2 mm. in diameter and responded feebly to light, and vision was 1/60 of normal. The vitreous was

Illustrates Sweet's case in which there were two large pieces (radiograph) of stone in the globe.



Skiagraph of various varieties of glass (Sweet). 1. Lead glass. 2. Piece of lens. 3. Piece of chemical glass. 4. Piece of soda-water bottle. 5. Druggists' green bottle. 6. Locomotive gauge glass. (One-half inch board between particles and plate. Exposure, 15 seconds.)



Skiagraph of various particles (Sweet). 1. Building stone. 2. Granite. 3. Pieces of cement pavement. 4. White marble. 5. Glass. 6. Anthracite coal. (One-half inch board between particles and plate. Exposure, 10 seconds.) (Page 99.)

PLATE VIII.

PLATE IX.

Lukens' case of traumatic enophthalmos. (Page 104.)

hazy and no fundus details were possible. The tension was normal. The vision of the uninjured eye was normal, and the pupil was the same size as that of the injured eye. He stated that the sunken condition of the eye was first noticed when the swelling subsided. Examination on May 7, 1906 (when the photograph was taken) showed about the same conditions that were noted twenty-three months before, except that the eye had decidedly more motion in all directions, and the fixing mass in the floor was not so palpable, the entropion of the upper lid had become established, and he had more control of the levator. A deep sulcus marked the upper tarsal margin, and the tip of the finger could be pressed between the eyeball and the orbital roof. The orbital fracture which was present in this case, if direct, was in the roof, although the fixing mass was in the floor, suggesting an indirect fracture in this location, which might also have resulted from his fall downstairs.

The Conservative Treatment of Severe Ocular Injuries. The question of enucleation should be settled within a reasonable time after the injury, and if it is plainly evident that the eye is not going to serve either of the purposes Nature intended for it, vision and beauty, it should be removed. To allow the patient to linger along with the eye slowly going to the bad may result in his finally not consenting to enucleation when urgently demanded.

While the giant magnet has saved more eyes than it has destroyed, at the same time it is to be remembered that its use is not a mere pulling contest, but is one of the most delicate and difficult operations in ocular surgery. Frank Allport[1] believes that steel in the posterior segment of the eye should be removed through a scleral incision. He does not believe that wounds of the lens are always followed by cataract.

He pays special tribute to argyrol as an antiseptic in ocular injuries, as well as prior to and after operations upon the eye. The use of Credé's ointment is recommended as a covering for the eye at night, with the daily use of iced applications, antiseptic irrigations, atropin and argyrol. He uses sodium salicylate in heroic doses after

(1) California Jour. of Med., June, 1906.

the method of Gifford. Daily sweat baths are of advantage for a few days.

An Improved Electro-Magnet for Use in Eye Surgery, designed by Parker,[1] measures 8 inches in length, with $1\frac{1}{2}$ inches of the core projecting. The diameter is 3 inches, while that of the core is $1\frac{1}{4}$ inches. The weight is $1\frac{1}{4}$ pounds. There is a button switch on the magnet which is arranged on the knife switch principle to avoid arcing and blackening of the contact points. There is a soft iron spring indicator at the front end of the magnet which shows contact when the current is on. To facilitate the easy handling of the magnet the tips are set at an oblique angle and fasten on with a lock instead of a screw. The tips intended for scleral penetration are drawn out to long, round, slender points. The ends of these tips are not rounded, but are countersunken so as to make them concave, thus affording a receptacle for the lodgment and better retention of the foreign body as it is pulled through the lips of the scleral wound.

OCULAR SYMPTOMS IN GENERAL DISEASES.

Signs in the Retina of Persistent High Arterial Tension and Their Diagnostic and Prognostic Import. The *importance of recognizing in the retinal vessels signs of arterial sclerosis,* especially when accompanied by high arterial tension, is considered by de Schweinitz[2] at considerable length. The author believes that when this condition can be recognized in the retina it is positive evidence that the sclerosis and arterial tension have reached a dangerous point with regard to eyesight as well as to life. Pathognomonic signs are change in size of retinal arteries causing a beaded appearance; loss of transparency; perivasculitis; and *indentation by the stiffened arteries at crossings.* The earliest indications are corkscrewing of small arterial twigs arising from large vessels, flattening of a vein where it is in contact with an artery and the congested disc, which is of a dull red appearance. Persistent asthenopia after presbyopia is well established in

(1) The Ophthalmoscope, August, 1906.
(2) Ophthalmic Record, August, 1906.

women, who frequently present symptoms of neurasthenia, is frequently relieved by reducing high arterial tension. It should be the duty of the ophthalmologist to note the warning of retinal changes indicative of arterial sclerosis and high arterial tension, and to see that patients are placed upon a diet and such medication as will tend to relieve this tension. Cases are reported which illustrate the disastrous consequences of failure to do this.

The Diagnostic and Prognostic Value of Albuminuric Retinitis. In chronic contracted kidney disease where the general condition of the patient is still good the beginning disturbances of vision are frequently the first symptoms, and the oculist, says Blessig,[1] is often first one to make the diagnosis of the nephritic condition. Albuminuric neuroretinitis often presents the picture of choked disc, which might point to the diagnosis of cerebral tumor. The general symptoms, such as headache, dizziness, vomiting, etc., often add to the difficulties of a differential diagnosis.

The prognosis of albuminuric retinitis as regards life is very unfavorable. Numerous hemorrhages in the fundus of the eye make the prognosis still worse. The prognosis as regards vision depends upon the character of the underlying affection of the kidneys. There can rarely be a *restitutio ad integrum.* In most cases there will remain an atrophy of the retina or of the optic nerve. In nephritis gravidarum the prognosis is usually good; here, with the improved condition of the kidneys, the changes in the eyes may disappear entirely. Detachment of the retina as a complication of albuminuric retinitis he has not observed.

Diabetic Retinitis. The case of a woman, aged 35 years, suffering from diabetes mellitis, with punctate retinitis about the posterior pole of right eye, is reported by Gamble.[2] The spots were brilliantly white and became widely scattered. Vessels normal in size. In the left eye the punctate deposits were most numerous at the nasal side of the disc and at the posterior pole with widely scattered spots throughout the retina. Vision was reduced in each eye to 1/vi.

A Case of Amaurosis Consecutive to Acute Anemia Due

(1) Wien. med. Blätter, Feb. 22, 1906.
(2) Ophthalmic Record, July, 1906.

to Hemorrhage is described by Carlini.[1] The patient was a man of robust health, who on July 21, 1905, accidentally cut a radial artery. He bled freely for twenty minutes before assistance came, by which time he was unconscious and in a very serious condition from loss of blood; the color of the skin and mucous surfaces was extremely pale, the respiration panting, the pulse filiform and scarcely perceptible, the pupils dilated and immovable. There were also vomiting and convulsions, sure signs of imminent death from exsanguination. Transfusion saved life, but the patient was unconscious until the afternoon of the next day, when he was found to be totally blind. The appearance of the eyes was normal and motility perfect. The sensibility of the cornea and conjunctiva was somewhat diminished. The ophthalmoscope showed transparency of the dioptric media and a normal fundus. The objective refraction was hyperopia of 1.5 D. in both eyes. The urine, examined daily, showed nothing abnormal. Vasodilator remedies were given. Two days after the accident the patient was apathetic. Vision had improved so that movements of the hand could be seen. The pupils reacted to light and the fundus was still perfectly normal. The next day, three days after the accident, fingers were counted. Four days after the injury the patient was much better; the pupils reacted promptly to light and the ophthalmoscope revealed nothing worthy of note. Vision was improved so that fingers were counted at half a meter. V. F. showed a marked and irregular contraction, peripheral, in such a manner that it was completely wanting in the lower half and restricted in the upper part on both sides in the O. D. and restricted only on the temporal side in the O. S. The general condition was good, and a careful examination of the various organs showed nothing abnormal. September 4, V. = 4/L in each eye, with an increase to 5/L on the 18th of the month. November 28 there was no material change. The writer attributed the amaurosis to changes in the optic centers. The left incomplete hemianopsia was due to the fact that the right center was more seriously affected by the hemorrhage than the left.

(1) La Clinica Oculistica, February, 1906.

Tubercular Affections of the Eye. A report is given by Parker[1] of tuberculosis as it appears in the conjunctiva, cornea, iris, ciliary body, chorioid and retina. A case of *tubercular keratitis* is reported as occurring in a woman, aged 36, who has been under observation for about a year and who continues to have the disease in an active form. The diagnosis was made because of its reaction to tuberculin. The cornea contains interstitial deposits near the margin which radiate towards the center. Near the cornea, in the sclera there are deposits which give it a nodular appearance. These portions are injected and have a peculiar violaceous tint.

Clinical Forms of Palpebral Tuberculosis. Palpebral tuberculosis is now more frequently observed, Rollet[2] states, because it is better known. The clinical forms are many. The author desires to call attention to a subcutaneous nodular form not described, and to other forms but little known. The author refers to the anatomic planes of the lids in which the tuberculosis may be lodged, viz: the mucous surface, the interstitial fibrous layer and the cutaneous and subcutaneous layers.

Tuberculosis of the conjunctiva is well known, but cases are not clearly defined. Rollet now recognizes three principal forms, the nodular, the ulcerated and the vegetating.

In the nodular form, upon a red, thickened, indurated mucous membrane is seen a plaque of gray granulations which later becomes yellow. The microscope shows these to be miliary tubercles.

The ulcerated form may appear at first like the nodular, but also resembles the vegetating lesion. At first there appears a small nodule which softens and ulcerates, opening externally. The borders are gray, irregular, with base a grayish yellow. Several nodules may be present and their ulcers extend and coalesce and give out a mucupurulent secretion.

The vegetating form at first resembles a fungoid trachoma, becoming later sclerosed like fibroid trachoma; it may have the aspect of trachoma with simple granulations; there may be tapioca-like hemispherical elevations with large base.

(1) Ophthalmic Record, July, 1906.
(2) Revue Générale d'Ophtal., September, 1906.

Rollet also calls attention to *tarsal tuberculosis,* in which the upper lid drops and is of semieliptical shape. The lesion is a deep plaque without adherence to the skin and is not painful. This tarsal lesion may accompany typical infiltrations of the derma or conjunctiva, with lymph glandular enlargement and other stigmata.

In regard to *tuberculosis of the cutaneous lid surface,* Rollet states that later it is the true lupus of Willan, with many varieties, and sometimes tuberculosis proper.

The author then considers *tuberculosis of the subcutaneous tissue,* of which there are two varieties, one with cold abscess and the other of nodular form, and he relates a case of each. In the latter form may be discovered isolated nodules in the external portion of the skin of the lids, over which the skin of the lids glides freely; no pain; conjunctival tubercles and adenopathic conditions assure the diagnosis. This variety has not been described, but deserves attention, it being different from lupus. Clinically, these subcutaneous nodosities resemble atypic tuberculids, which latter are not inoculable and which have recently been described by Darier and Roussy under the name of hypodermic sarcoids.

Primary Tuberculosis of the Conjunctiva and Its Consequences: the Conjunctiva as the Point of Entrance of Tuberculosis. The opening of the lids leaves the conjunctiva in direct contact with the external air and a great variety of germs are deposited upon its surface. Though the bacillus of Koch has not been met with on the normal conjunctiva, there is no doubt that it is often deposited there with the dust of the air that carries it. The conjunctiva may be compared in this respect to the other cavities of the face, the buccal cavity with the pharynx and tonsils and the nasal fossa with the accessory sinuses, and tubercular bacilli have often been found in them.

Cabannes[1] calls attention to the distinctness with which the infection, fortunately remaining local, was propagated in the neighborhood step by step. Tuberculosis of the skin of the face, of the preauricular glands and then of the maxillary and cervical glands. He has studied a number of published cases with reference to the organs sec-

(1) Archives d'Ophtal., January, 1906.

ondarily affected and considers the usual order of infection to be cornea, sclerotic and ocular globe; lacrimal passages, distant organs, generalization. Corneal lesions, rare in conjunctival tuberculosis, often so closely resemble those met with in trachoma that they can be distinguished only by microscopic and bacteriologic examination. Propagation by the sclerotic is exceptional. The destruction of tissue may not pass the sclerotic, but in some cases has penetrated it and set up panophthalmitis. Extension of tuberculosis from the conjunctiva to the lachrymal sac is rare, and even doubtful, while extension from the nose is comparatively common.

The first important stage in the propagation of tuberculosis from the conjuntiva is the glandular stage. The first glands affected are the preauricular and parotid, corresponding to the lymphatics of the outer two-thirds of the conjunctiva, and the submaxillary glands which are connected with the lymphatics of the internal angle of the eye. The order of frequency of involvement is: the preauricular, the submaxillary, the cervical, the parotid and the masseteric.

The glandular enlargements may be so extensive in the beginning as to mask the conjunctival affection, which is not detected until later. The glands sometimes suppurate.

Sometimes the infection proceeding from the conjunctiva to the glands stops in its course to produce a tuberculosis of the cheek.

When the tubercle bacillus reaches a gland it develops there, and even if it is exceptional to find it in the secretion, inoculation in animals gives positive results.

Most frequently tuberculosis of the conjunctiva does not pass the barrier of the glands. It may, nevertheless, in exceptional cases, by way of the lypmh or blood, reach more distant organs and end in death by pulmonary or laryngeal phthisis, generalized tuberculosis or tubercular meningitis, and should, therefore, be diagnosed early and energetically treated. The author's preference in treatment is for repeated thermocauterization.

Tuberculosis of the Chorioid. The basis of a paper on this subject by Carpenter and Stephenson[1] is furnished by 80 cases of chorioidal tuberculosis, of which 49 were acute,

(1) Die Oph. Klinik, Aug. 25, 1906.

11 chronic and 20 with terminal cicatricial changes. The following types are described: acute miliary tuberculosis, chronic tuberculosis of the internal organs and chronic surgical tuberculosis, healed cicatricial chorioidal tuberculosis. In the first class the tubercles are found principally in the vicinity of the papilla and macula and at times at the center of the macula. More frequently but one eye is affected. In 17 out of 29 cases but one lesion was found. In the other cases, as a rule, there were two or three. In one instance in a 3-year-old child there were ten in each eye. They are round or oval and at times kidney-shaped, and only rarely irregular. In color they are either yellow or gray-white surrounded by a blackish zone, giving the impression that the pigment of the pigment layer of the retina had here acquired a greater density. Microscopically this is found to be the case. The surface of the tubercle is free from pigment and it has the appearance as though the pigment epithelium had been eroded. When visible the chorioidal vessels end abruptly in the neighborhood of the new formation. In only one instance was the tubercle surrounded by a red band which was either a blood vessel or a hemorrhage. The retinal vessels frequently cross the tubercle or lie in the surrounding edema. They vary from the size of a retinal vessel to a mass eight times the diameter of the disc. The color was in general uniform, but in one case there was at the center a group of glistening gray points. In a second there was a central vacuolization due to a dilated chorioidal vessel. Occasionally there are pigment spots and small pigment rings. In three atypical cases the tumor consisted of an oval granular mass near the disc. There was never a dense pigment border as in syphilitic lesions. Chorioidal lesions occur in visceral tuberculosis and in tubercular meningitis. In 26 of 36 cases there was meningitis. Rare forms seen were: (a) a triangular gray new formation, 8 discs' diameter in size, with edema of the retina, tortuosity of the vessels and an uneven pigmentation of the fundus. Autopsy showed a conglomerate tubercle at the macula. (b) Usual appearances, with the surface appearing granular from deposit of pigment. (c) Below the macula a conglomerate tubercle, with black and white streaks in the macula. In 16 of 47 cases there was

neuritis of a moderate degree, at times limited to a sector of the disc.

Of the second class the author states that it is not generally known that chorioidal lesions are ever associated with these diseases. They were present 12 times in 19 cases of chronic tuberculosis in patients varying in age from 8 months to 16 years. The tubercle has the same appearance as in miliary tuberculosis. As an example of disseminated chorioidal tuberculosis they show a picture presenting the characteristics of a bilateral syphilitic disseminated chorioiditis. Of the third class the authors state that the scarcity of post-mortems makes it impossible to state positively that these changes were due to tuberculosis and not syphilis, but in a series the associated symptoms support the former supposition. The principal features of healed tuberculosis are: 1. The central location. 2. Their size and limitations to one eye. 3. A central atrophic area bordered by pigment and frequently surrounded by a zone of pathologically disturbed chorioid. 4. At times quite small atrophic areas in their neighborhood. The pathologic anatomy corresponds in all important particulars with tuberculosis in general. In typical cases there is localized thickening from round cell infiltrate in which the giant cells of Langerhans are present in small or large numbers. Epithelioid cells are entirely or almost entirely absent. Examination for bacilli frequently gave negative results, very likely on account of previous hardening by formalin. In one instance they were present in large numbers.

Tuberculosis of the Eye Treated with Tuberculin. Von Hippel[1] employed this mode of treatment in fourteen cases; in some of them 1/50 mm. was sufficient to produce a reaction of some duration; in these cases great caution is necessary at the increasing dosage. For diagnostic purposes 1 mm. of old tuberculin can be injected. In order to insure a lasting result the treatment with tuberculin must be kept up for a considerable length of time; the general condition improved in nearly all the cases; the swelling of the spleen and lymphatic glands disappeared and most of the patients increased in weight. Should the remedy not always lead to a complete cure, it is still

(1) Wien. Med. Presse, Feb. 25, 1906.

worthy of trial, because it produces beneficial results in many respects. Bad effects on the general health were never observed in this method of treatment.

Septic Retinal Changes in Typhoid. In a typhoid patient, aged 22, shortly before death, small, whitish, round foci of the size of ½ disc, close to the larger vessels, encircling the disc at some distance, were found by Paul.[1] The macular region was free. Besides, there were large and small hemorrhages, but the vessels showed no changes. Twenty hours after death the eyes were enucleated and the following conditions noted: The foci were exclusively located in the layer of the nerve fibers in the immediate neighborhood of the vessel. The layer was thickened from local edema of the retina and varicose hypertrophy of the nerve fibers, but there was no infiltration with small cells at the foci.

Paul considers the condition to be of toxic origin. As the same kind of foci have been observed in sepsis, first described by Roth, the author is in doubt whether these foci, retinal hemorrhages, etc., are to be attributed to a direct action of the specific bacterial toxin or to toxic substances, generated by the organism under the influence of these toxins. They certainly are rare in typhoid, since Heine found only this case out of 82, examined ophthalmoscopically.

Holtz described circumscribed purulent foci in the chorioid. Retinal hemorrhages and optic neuritis have been observed rather frequently, but none of the authors saw these whitish retinal particles, which on the other hand have been observed besides septic affections in other diseases of the blood. The bacteriological findings were negative.

The Complete Absorption of a Pannus Trachomatosus After Typhoid. Fever. This was a case of very dense pannus of each cornea, under the care of Frank Todd,[2] which was in the hospital undergoing surgical and local treatment for the lid and corneal condition. Very little improvement had taken place. She contracted typhoid fever. All local treatment was stopped. In two weeks' time the pannus had disappeared, leaving the corneæ clear,

(1) Klin. Monatsbl. f. Augenheilk., p. 73, 1906.
(2) Ophthalmic Record, January, 1906.

with the exception of an ulcer on one cornea which had so thinned the membrane as to allow it to bulge. After it was incised the ulcer rapidly healed. S. Marx White offers the possible explanation of the disappearance of the pannus that the typhoid toxin causes a diffuse endothelial proliferation and these cells become actively phagocytic, taking up red blood cells, lymphocytes and other materials, and that they may have been capable of removing very largely the foreign tissue in the cornea.

Monolateral Infective Optic Neuritis After Measles. Measles, like all infective general diseases, may cause complications which are often benign, but occasionally assume a grave character. Among the latter, manifestations in the central or peripheral nervous system are important. Cases of hemiplegia, infantile paralyses, aphasia, hysteria, hemorrhagic meningitis, etc., have been reported.

Measles also determine the appearance of peripheric neuritides, and among these the most frequent and the most serious is optic neuritis. Vancresson[1] refers to a number of cases in literature and reports the following one: A soldier, 24 years of age, had an attack of measles, with severe bronchitis, high temperature and intense headache on the 12th of September. On the 22d, when he was convalescent, vision was suddenly and almost completely lost in the right eye. With the ophthalmoscope the papilla appeared punctated as if it had a number of minute hemorrhages on its surface. There was no edema and the disc margins were sharply defined, but the vessels were slightly dilated. In a few days the congestion became more intense, the papilla lost its definite outline and the vessels were more enlarged. No albumin in urine. Left eye normal.

On the 12th of November vision was entirely abolished in the right eye and the ophthalmoscope showed a glistening white disc.

In most cases, as in this one, the neuritis commences several days after the disappearance of the eruption. The infection in this case must have been particularly violent, as the evolution of the disease is not usually nearly so rapid, and in many cases complete recovery has resulted. Generally both eyes are affected.

(1) Annales d'Oculistique, March, 1906.

In view of the violent headaches the author is inclined to believe that the neuritis had its origin in meningitis.

Ocular Headaches. Zentmayer[1] believes that a very large percentage of headaches is due to refractive errors, and that a very low error of refraction may be responsible for ocular headaches.

The author quotes from a personal communication from Casey Wood, who states, from replies received from his circular letter on the "Relation of Migraine to Refraction and Oculo-Muscular Errors," that "most of the ophthalmologists and neurologists are of the opinion that in the great majority of instances no ocular treatment has had any effect whatever upon what might be termed "ophthalmic" migraine. The majority also believe that in a comparatively small proportion of cases (say 25 per cent.) some relief was obtained by treatment of the eyes. In a still smaller percentage of cases (10 per cent.) decided and immediate relief resulted. In about 5 per cent. a complete and permanent cure resulted."

The author believes, from his personal experience, that true migraine can be favorably influenced by correcting any existing ocular defect.

On New Eye Symptoms in Graves' Disease. Harold Gifford[2] has observed within the last few years, in three patients, an involuntary resistance to eversion of the upper lid as an early symptom of Graves' disease. It is probably due to irritability of Mueller's muscles. Dalrymple's (generally called Stellwag's) symptom, viz.: the exposure of the sclera above the cornea in ordinary horizontal fixation is possibly the static form of the symptom.

Another early, not well known, sign of Graves' disease consists in a thickening of the tissues below the eyebrows. It is not a true edema, because the skin is thickened and sometimes red. In two cases seen in the last few years it was the first manifestation of the disease observed by the patients.

Gifford emphasizes the diagnostic value of these symptoms in doubtful cases, especially as the patients come on account of the swelling of the lids and do not mention palpitation of the heart, etc.

(1) Penna. Med. Jour., June, 1906.
(2) Klin. Monatsbl. f. Augenheilk., p. 201, 1906.

Pathogeny and Treatment of Exophthalmic Goiter. Four years ago Metz[1] published some contributions to the pathogeny of exophthalmic goiter. The main conclusion was that the disease is an intoxication of the blood by the products of the thyroid secretion—that the etiology should be sought for in a morbid process of the thyroid gland. He considered the other known etiologic theories and rejected them all. He does not now undertake to point out the exciting cause of the hyperthyrosis, but considers that the disease should be placed among the neuroses. Metz briefly reviews[1] the clinical picture of the disease, which, as he states, occcurs in the large majority of instances in females. He also details the difference between exophthalmic goiter and myxedema. The treatment which the author recommends is the use of an antithyroid serum, and describes the method of obtaining it is from the Jersey bull from which the thyroid has been removed. The daily dose of the serum is 5 centigrams.

Ocular Manifestations in Intracranial Diseases of Otitic Origin. The frequency and character of *eye lesions as a result of otitic disease* is discussed by Spicer,[2] who states that there are widely diverse reports as to the conditions found in meningitis, thrombosis and brain abscess. Some authors find very few in large numbers of cases, others find a large percentage in a comparatively small number of cases. The author concludes that we may have one or more of the following ocular manifestations of the external signs: nystagmus, paralysis of the motor and sensory functions of the eyes and dilation of the pupils. Cellulitis also occurs with protrusion of the eyeball, which may be fixed by infiltration of orbital tissue. Internally, we may have optic neuritis or choked disc, of which he has found 34 instances. Papillitis occurs occasionally, also neuroritinitis and optic atrophy. The vessels are quite frequently changed in character. A seroplastic purulent chorioiditis is noted, rarely ending in panophthalmitis.

Metastatic Affections of the Eye. A number of examples of metastasis affecting the eye have been reported by Holmes and Spicer.[3]

(1) La Clinique Ophtal., July 25, 1906.
(2) The Laryngoscope, August, 1906.
(3) Medical Press, Oct. 24, 1906.

The first case was that of a young man who had a sudden attack of pain in one eye, with obliteration of the central part of the field of vision. He was in good general health, except for a large crop of boils on the buttocks. On examination of the eye three days after the attack of pain, a brilliant green mass was seen springing from the center of the disc; it was round, sharply defined, and had no appearance of structure, such as hooklets. Its appearance suggested a parasitic cyst. It continued to grow, and was making the patient very ill. It was lacerated with a needle under ophthalmoscopic guidance, but it only contained some cloudy opaque material like pus. The eye was enucleated. The swelling was found to be an abscess in the substance of the retina, having in its center a large mass of staphylococci. The patient made a rapid recovery in health.

The second case was also that of a young man, who had had a large boil on the neck, and was suddenly seized with pain in one eye, with loss of sight. He had well-marked phlebitis of the retinal arteries in one eye and slightly in the other. After prolonged treatment one eye got well, and the other became quiet with loss of sight. Two years later it became acutely inflamed and was then enucleated. Although very seriously ill at the time, he recovered promptly after removal of the eye, showing it to be the only part affected.

The third case was also that of a young man, who had retinal phlebitis, followed by local keratitis profunda after a serious attack of diarrhea and ptomaine poisoning.

The fourth case was one of diffuse exudation on the surface of the chorioid, invading slowly nearly the whole of it and producing in places detachment of the retina. This also occurred in a young man suffering from a large crop of boils on the neck. Treatment by anti-staphylococcal injections was commenced, but he refused to continue it.

Ante-partum Ophthalmia. Thirty-five cases have been collected from the literature and arranged in table form by Stephenson.[1] Seventeen cases have been collected and arranged in a second table which have not before been reported. In all these cases the ophthalmia developed

(1) The Ophthalmoscope, April, 1906.

within twenty-four hours after the birth of the child. It is believed by the authors that this period of incubation is too short for infection to have occurred at or after birth, and that it points conclusively to ante-partum infection. Their conclusions are as follows: First, instances of ante-partum ophthalmia are not so uncommon as hitherto believed, and, second, about one-half of the cases (44.5 per cent.) are satisfactorily accounted for by a premature rupture of the membranes, allowing access of micro-organisms to the baby's conjunctival sac; third, in the remaining cases (55.5 per cent.) a slight injury to the membranes may determine access of micro-organisms, or infection through the uninjured membranes must be assumed to have taken place; fourth, increased temperature of the conjunctival sac *in utero,* enhanced virulence of the causative micro-organism, feebleness of the babies, slight lateral tears of the membranes, position of the fetus in the maternal passages, and the condition of the placenta can not be shown to be connected with the causation of ante-partum ophthalmia; fifth, several of the so-called "congenital" anomalies of the eyes, as corneal opacities, staphyloma, microphthalmos, cryptophthalmos and lachrymal abscess, are probably to be explained on the theory of an intra-uterine infection.

OCULAR TUMORS.

Transillumination of the Eye (Diaphanoscopy) in the Differential Diagnosis of Intraocular Tumors. Transillumination consists in sending a beam of light through the globe, in a dark room, whereby the whole eye, if

Fig. 20. Würdemann's Transilluminator.

normal, is usually illuminated, or, if an opaque body, such as a tumor, be present, a shadow will be shown in a similar way to that given by transillumination of the face in diseases of the maxillary sinuses. An illustration of an

instrument devised by Würdemann is shown. It is a simple attachment to the handle of an electric ophthalmoscope. The usual electric globe of this instrument is replaced by another of five candle power, on the end of which there is a lens. The cone-shaped screw cap of the instrument devised by Würdemann[1] is shown. It is a inch in length, which comes in contact with the end of the lens. Nearly all the light is thus focused in the glass rod and brought out through it to the tip and there projected as a beam of light through the eye or the structures to be illuminated. It also serves to transilluminate the sinuses of the face.

The Causes of Increased Tension in Intraocular Tumors. The clinical histories of 8 cases of intraocular tumor and the histological changes in the enucleated eyeballs are discussed by Birbacher.[2] In 7 of these the rise of tension was due to closure of the sinus of the anterior chamber by cicatricial adhesions of its walls, thus shutting off the access to the canal of Schlemm, the main lymphatic outlet of the eyeball. Undoubtedly the products of metabolism of the tumors are conveyed (particularly through the lymph current) to the sinus, and create, by chemical irritation, inflammations which lead to adhesion of neighboring endothelial surfaces. In one case the lumen of a vortex vein was completely filled with sarcomatous tissue, thus stopping the lymph-current in the emissary of the vortex vein and the outflow of blood in the vortex vein itself. In two cases the tumor occupied the posterior segment of the globe and blocked the outlet along the optic nerve, thus contributing to the excess of tension, brought about by simultaneous obstruction of the sinus.

In order to strengthen by experiment this view of the inflammatory action of the products of tumors at distant places, Birnbacher injected Koch's tuberculin into the vitreous of rabbits and produced inflammations at the sinus and in the iris.

He summarizes the conclusions from his anatomical and experimental investigations as follows: 1. The causes of increased tension in intraocular tumors differ as much as in primary inflammatory glaucoma. 2. Intraocular pres-

(1) Ophthalmic Record, May, 1906.
(2) Beiträge zur Augenheilk., p. 89, 1906.

Angioma of bulbar conjunctiva (Gifford).

Gifford's case of angioma of the conjunctiva after treatment by injections of absolute alcohol. (Page 122.)

PLATE X.

sure is increased by impediments in the outlets of lymph and blood. 3. The most common hindrance is the closure of the sinus of the anterior chamber. It may occur from inflammatory adhesions of the root of the iris and posterior surface of the cornea caused by the products of metabolism of malignant tumors, including tubercles, or by the tumor directly growing into the sinus, or through dissemination of detached particles of the tumor into the sinus. 4. The encroaching of tumor masses upon the veins is also a cause of increased intraocular tension.

Angioma of the Upper Lid: Operation. The operative technic in the *removal of an angioma of the upper lid* in an infant, aged 6 months, is furnished by Charles.[1] A modified Desmarre's clamp was used to control the hemorrhage. A skin incision was made along the inner edge of the clamp ring, the skin dissected from the growth, the vessels supplying the tumor at the temporal and nasal ends were ligated, and the growth dissected out. The skin flap was then sewed into position with fine sutures. The author reports but slight disfigurement.

Cavernous Angioma of the Eyelid. A most interesting example of this neoplasm is reported by the elder Risley,[2] It occurred in an eleven weeks' old child, with history of rapid growth of tumor of the right lower eyelid. There was a dark red, purplish, chestnut-like tumor occupying two-thirds of the lid. It was somewhat pedunculated. When the child cried the tumor became so tense as to almost burst. In order to avoid hemorrhage, an attempt was made to destroy the growth by electrolysis. It was not successful, as evidences of spreading became manifest. The growth was finally successfully removed by the use of an Ericson's suture.

[An example of this rather rare tumor was operated on by the Editor with success four years ago. After making the usual preparation for hemorrhage, which was profuse, the tumor was enucleated with its overlying pigmented skin. A large Wolffe graft was inserted to fill the vacancy. There has been no recurrence of the tumor.—Ed.]

Angioma of the Conjunctiva *successfully treated by injections of absolute alcohol.* One of these very rare

(1) Interstate Med. Jour., September, 1906.
(2) Ophthalmic Record, March, 1906.

tumors has been seen by Gifford.[1] He finds that only 58 cases, including his own, have been reported. The left eye was apparently pushed out by a dark red, lobulated tumor which extended from the caruncle to $\frac{3}{16}$ of an inch beyond the center of the corneal margin above and below, reaching to the fornices but not invading the palpebral structures. He injected two or three drops of absolute alcohol into various parts of the tumor. The injected portions at once assumed a pale grayish-pink color, and after a week or ten days the tumor was much reduced in size. The injections were then repeated, the needle being carried, part of the time, $\frac{1}{2}$ inch into the orbit along the inner side of the globe. After this, alcohol was injected every two or three weeks for the next two months; at the end of this time the original tumor had practically disappeared, but now the conjunctiva from the outer $\frac{1}{3}$ of the corneal margin to the external canthus, which had seemed normal, became dark-red and he began to fear an extension of the growth around the deeper portions of the globe, and more alcohol was injected, $\frac{3}{4}$ inch deep, along the inner wall of the globe and $\frac{1}{2}$ inch deep into upper and lower fornices. After this the improvement was steady, and when she went home there was no tumor visible and the only trace of the former trouble was a moderate congestion of the inner half of the conjunctiva, which was steadily improving.

The injections were always made during light chloroform anesthesia and were followed by only moderate swelling and very little pain, at no time was there any sign of breaking down or necrosis on the surface. During the whole course of the treatment the only symptom that caused the least anxiety was a swelling of the left side of the face which developed two or three days after the last deep injections had been made into the orbit. The child seemed depressed and the cheek below the zygomatic process was quite puffy for several days; but this all cleared up without any special treatment.

Epithelioma of the Nose and Lids Treated by Radium. An epithelioma extending from the alæ naris to the eyelids was treated by Darier.[2] He exposed it daily for one

(1) Ophthalmic Record, December, 1906.
(2) Wien. Med. Wochenschr., April 21, 1906.

and one-half hours to 5 mgm. radium. After ten days' treatment improvement was so marked that there only remained a reddened skin with two small erosions. An unpleasant complication of the case was partial destruction of the tarsus and the loss of some cilia. The purity of the various radium salts varies greatly and can be recognized by means of the electroscope. The author claims that the effect of radium is diminished even 90 per cent. by enclosing it in glass. He employs 5 mgm. radium sulphate which is fastened to a small copper plate by means of glue.

A Case of Epithelioma of the Ocular Conjunctiva of Unusual Size is reported by Jennings.[1] It occurred in a man, otherwise healthy, at the age of 71, was four years in developing and was not painful. Size horizontally, 4 inches, vertically, 3¼ inches; it protruded 3 inches. The tumor was lobulated, of a reddish cream color, covered with scabs, bled easily and had a bad odor. It was found to be *attached to the palpebral as well as the ocular conjunctiva.* Its removal demanded the complete exenteration of the orbital contents, together with the eyelids. The gaping wound was packed with gauze and covered by sliding skin from the brow and cheek. Microscopic examination showed the growth to be an epithelioma of the ocular conjunctiva, with infiltration of the cornea, but not involving the other structures of the eyeball.

Mucous Fibroma of the Bulbar Conjunctiva. A man, 57 years of age, stated to Trousseau[2] that the trouble in his eye had commenced fifteen years before he applied for treatment. At that time he noticed a little whitish tumor, scarcely as large as a millet seed, on the nasal side of the bulbar conjunctiva of his left eye. It occurred without traumatism, irritation or preceding disease of the eye. His general health was excellent, and he gave himself little concern about the growth, which did not inconvenience him. It developed slowly but steadily and gradually assumed a reddish tint. At the time of the examination it extended from the caruncle to the corneal limbus, but was not adherent to the latter. The size of the tumor was that of a large olive. It was of a reddish color, and the

(1) Annals of Ophthalmology, April, 1906.
(2) Annales d'Oculistique, March, 1906.

conjunctiva over it was traversed by large vessels. It was enucleated without difficulty, as it had no firm adhesions. Examination showed it to be a fibrous tumor of the submucous connective tissue. Trousseau believes that no similar tumor in this location has been reported before.

Serous Cyst of the Cornea. The rarity of corneal cysts is a sufficient excuse, thinks Dujardin,[1] for reporting a single case. The patient, 42 years of age, consulted him on July 8, 1906, in regard to a small tumor of the right cornea which appeared about nine months previously and had slowly increased in size until it had become a discomfort. The cyst, which was situated at the internal portion of the cornea near the border, was 5 millimeters long vertically by 2 broad. The surrounding cornea was clear; no trace of pterygium; the growth did not encroach upon the sclera; eye was otherwise healthy; no conjunctival hyperemia. The cyst, which was excised close down to the cornea, did not involve corneal tissue. A superficial galvano-cauterization was done after the excision. Fifteen days afterward the eye was well.

Dujardin states that the pathogeny of corneal cysts is very obscure, developing, as they do, without apparent cause.

[The reader will find an account of a case of cyst of the cornea by Frank in the Annals of Ophthalmology for July, 1905.—Ed.]

The Origin of Papilloma of the Cornea. The following cases of this neoplasm are described by Lauber.[2]

Case 1.—A man, aged 43, suffering from old trachoma, noticed for three months the growth of a whitish tumor on his right, opaque cornea. At the lower border a tumor, 15 mm. high, of bluish pink color, was firmly attached, commencing in the conjunctiva near the limbus and reaching 3 mm. into the cornea. It was removed with a spatula, leaving a facet on the cornea. Its bulk consisted of epithelial cells, which covered scanty papillæ and blood vessels. The stroma of the papillæ contained loose connective tissue with round cells, and was abundantly vascularized.

Case 2.—The right eye of a woman, aged 62, was injured by lime three years ago. Shortly afterward a tumor devel-

(1) La Clinique Ophtalmologique, Sept. 25, 1906.
(2) Zeitschr. f. Augenheilk, p. 254, 1906.

oped on the conjunctiva, which was removed. Within the last year a group of tumors grew from the temporal, lower and nasal portions of the sclero-corneal junction. One was situated on the cicatrized area of the cornea, the peduncles of the other came from the conjunctiva. All were of a pale red color and were composed of small lobules. The peripheral portion of the cornea was covered by a thin vascularized tissue. The tumors, cut off with a lance-shaped knife, contained more papillæ than those in the first case and very numerous vessels of considerable caliber. Deviating from similar cases, the epithelial layer was separated from the stroma by a thin basal membrane.

Both cases demonstrate, in concordance with the literature on the subject, that papillomas of the cornea always develop on the soil of former vascularization, brought about by inflammatory or traumatic processes.

Epithelial Cyst Formation in the Iris. Although epithelial cells, proliferating in the iris, usually result in cyst formation they seldom become malignant. Oatman[1] discusses the method of introduction of the epithelial cells into the iris tissue, which is of mesoblastic origin and devoid of epithelium. He disagrees with the *implantation* theory of Buhl and Rathmund, that, as a result of a perforating wound, a fragment of surface epithelium is carried into the eye and implanted in the iris and that these engrafted cells proliferate and form solid epithelial tumors or epithelial lined cysts and favors the *extension* theory of Stölting, that the epithelial cells are not detached from the surface and implanted in the iris, but that the surface epithelium, during the process of healing, spreads over and into the iris tissue exposed to the wound. Oatman states that if from any cause a corneal perforation remains open and no obstacle is presented to the progress of the ingrowing epithelium, the latter will not confine itself to the anterior division of the wound, but spreads beyond to contiguous parts. Such migration of cells may be followed by various unfortunate results; the interposition of epithelium between the wound surfaces may delay union or prevent cicatrization. In the latter case a corneal fistula will be established. The cells may extend to the iris or line the anterior chamber. * * * Instead of spreading

(1) Archives of Ophthalmology, July, 1906.

throughout the anterior chamber, the epithelium may be confined to spaces created by inflammatory adhesions between the iris and cornea. * * * Proliferating epithelium confined to iris tissue usually forms a cyst. This result is not wholly due to its confinement within a circumscribed space, as non-malignant, migrant epithelium appears to possess an inherent tendency toward cyst formation.

The author directs attention to this tendency of corneal epithelium to penetrate, as having a direct bearing on the treatment of corneal wounds and also to the importance of securing accurate coaptation of corneal flaps.

Leucosarcoma of the Iris. The following conclusions are drawn by E. V. L. Brown[1] on the basis of clinical and histologic studies:

1. Ribbert's theory of the origin of all uveal sarcomata from chromatophores is worthy of careful consideration.

2. The analogy between the round, spindle and star-shaped cells in these malignant growths and the spindle- and star-shaped cells found in the embryonic chorioid is incomplete, as a round cell first stage has not been proved to be present in the latter.

3. It is more reasonable to suppose that the cell reversion takes place to any one of these forms of sarcoma analogous to the relations which obtain between embryonal and pathologic conditions in glioma, than it is to suppose that lower cell forms are transformed into higher.

4. So-called leucosarcoma of the iris offers a more favorable opportunity for the study of the chromatophore theory than does sarcoma of the chorioid, because here the normal chromatophore is much less heavily pigmented than in the normal chorioid, or than the chromatophore in the iris. Pressure, too, destroys the normal cell.

5. The term leucosarcoma should be retained, but used only in reference to the clinical appearance of iris sarcoma.

Metastatic Carcinoma of the Ciliary Body. A case in a woman, aged 33, is described by Cutler[2], the growth being secondary to carcinoma of the breast. Only two other cases of metastatic carcinoma involving the ciliary body

(1) Jour. Amer. Med. Assoc., Aug. 11, 1906.
(2) Trans.-Amer. Ophthal. Soc., 1905.

and iris alone have been reported, one by Uhthoff, the other by von Briehn.

The Diagnosis of Sarcoma of the Chorioid. The diagnosis of a case of sarcoma of the chorioid in a woman, aged 43, was made by Pentscher[1] from a migration of sarcomatous elements into the anterior chamber. A black mass, resembling an old hyphema, had accumulated in the lower part of the anterior chamber and measured 1½ to 2 mm. high. A portion of it, evacuated by puncture of the cornea, contained brownish black, irregularly formed pigment, as found in sarcoma of the chorioid. The examination of the enucleated globe showed an intense rarefaction of pigment in the chorioid and a sarcoma covering the optic disc from all sides. Similar observations have been made by Hirschberg and Fehr.

Glioma of the Retina; Enucleation. *No Return in Eight Years.* Cures after ablation of glioma of the retina are rare enough to warrant the publication of those cases which come under observation. For this reason de Speville[2] reports a case. The patient, a robust child of 3 years, had never been sick; five other children in the family all healthy. The father is gouty and suffers from migraine and gastric crises; mother has always had good health. Patient was first seen September 26, 1898. The parents had observed that for two months the left eye had a peculiar aspect when turned toward the right. The eye externally presented nothing abnormal; central vision was excellent. When the eye was directed toward the right the pupillary reflex very clearly gave the so-called "amaurotic cat's eye." Ophthalmoscope demonstrated in the internal portion a whitish-yellow tumor about the size of a pea pushing into the vitreous humor; neoplasm was hidden by the iris when looking at the macula, which latter region was normal, as also were the upper external portions of the fundus. In the inferior equatorial regions were several small limited tumors presenting the aspect of white cotton. Enucleation September 30, 1898. Microscopic examination proved the tumor to have been a typical exophytic glioma. Child is at date of writing perfectly healthy.

[This case is rare in more senses than one because it was

(1) Centralbl. f. Augenheilk., p. 139, 1906.
(2) La Clinique Ophtal., March 25, 1906.

discovered much earlier than usual and was not of the flattened, plate-like variety, but of a (less malignant) isolated, sessile character.—Ed.]

Glioma of the Retina; Reports of Four Cases. The clinical histories of four cases of glioma of the retina occurring in his private practice are reported by S. C. Ayres.[1] He also quotes the statistics of various writers on this subject and refers to Wintersteiner's published reports of 467 cases, which showed that 49 per cent. occur in the first two years of life; 67 per cent. in the first three years, and that about 7 per cent. are congenital.

Epithelioma of the Orbit. One of these orbital tumors was operated upon by R. H. Johnson[2] and seemingly had no connection with the antrum. About a month later evidences of an antral growth became manifest when the superior maxilla was removed. Death occurred ten days later.

Endothelioma of the Orbit. A man, 30 years old, presented himself to Dehogues[3] with his left eye pushed nearly out of the orbit by a round hard tumor in the upper internal angle, which was first noted some three years before. The vision was about lost. After a negative result from treatment it was decided to operate, and the tumor was found to be attached by a pedicule deep in the orbit. Rapid, uneventful recovery and restoration of normal vision. A tenotomy of the inferior rectus, combined with an advancement of the superior rectus, was performed later with nearly perfect result. Under microscopic examination the tumor proved to be an endothelioma. Dehogues considers the case of special interest from the fact that a stretching of the optic nerve to such an extent and for so long a time did not result in its atrophy. There had been no return at the end of 2 years.

Two Cases of Osteoma of the Orbit Successfully Treated by Operation. The clinical histories and *details of operation in two cases of osteoma of the orbit* successfully removed by operation without involvement of the eyeball are given at length by Arnold Knapp.[4] In the first case

(1) Archives of Ophthalmology, July, 1906.
(2) Ophthalmic Record, September, 1906.
(3) Archivos de Oftalmologia, March, 1906.
(4) Archives of Ophthalmology, July, 1906.

the tumor was located in the upper, inner angle of the orbit, displacing the eye downward and outward, and was attached by a small pedicle. After operation the wound was closed and healed by primary union. In the second case the mass occupied the upper half of the orbit, displacing the eye forward and downward on the cheek, and had a broad attachment to the entire upper bony wall. The origin of the growth was from the superior wall of the frontal sinus and it had penetrated the inferior wall and extended into the orbit. The wound was left open and a gauze drain inserted. Recovery was rapid and the wound closed in eleven days.

NEW INSTRUMENTS AND APPLIANCES.

Remarks on the Instruments Commonly Used in Ophthalmic Surgery. Formerly the handles were roughened, like files, which assured a good hold for the fingers, but now, in the interest of facility in cleaning, they are often made smooth, which is very inconvenient. Instrument makers, says Landolt,[1] should furnish us with forceps that won't slip in our fingers and leave us to look after the sterilizing.

As we rarely use forceps perpendicularly to the point of application, the teeth, in the axis of the forceps, should be oblique to the object that they seize. The author prefers forceps with the teeth placed obliquely to their axis but perpendicularly to the surface on which they are to act. The teeth of forceps become blunted more quickly than we suppose, and should be carefully inspected to see that they are sharp and that they meet exactly.

Needle holders are of two kinds, those that are held closed by an effort of the fingers and those that have a mechanism to keep them closed. More liberty of action is allowed by forceps with an automatic closure, and it is convenient to receive from an assistant needles in the holder. Many holders are likely to break a fine needle. The author prefers a form like firm dissecting forceps with the point of the branch covered with copper, and which are closed by a wedge-like mechanism which brings the branches together gradually but forcibly.

(1) Archives d'Ophtalmologie, May, 1906.

The handles of such instruments as Graefe knives, keratomes, cystotomes, etc., he thinks, deserve more attention than is usually given them. A few years ago these handles were always made of *ivory which is an ideal material for the purpose.* Its weight is convenient and its contact is much superior to that of metal. Without adhering to the fingers ivory does not slip on their surface. One may hold an instrument with an ivory handle with the greatest lightness and move it in all directions without the slightest pressure and without fear of its slipping. But it has been objected that ivory does not bear the high temperature that sterilization demands and metal has been substituted. In general surgery, where the knife is held by the hand, the difference between a metal handle and an ivory one is not important, but in ophthalmic surgery it is great. Even the hollow metal handles are too heavy and they are not well balanced. Some instrument makers have given a certain roughness to aluminum handles, but unless aluminum is perfectly pure it is susceptible to injury by antiseptic solutions. In fine, nothing can take the place of ivory handles; 120° C. for the autoclave and 140° for the dry stove are sufficient for sterilizing, and ivory will bear these temperatures for the necessary time, which it is useless to exceed. What does not bear the temperature is less the ivory than the cement which is used to fasten the blade in the handle. Instrument makers have fixed the blade in an ivory handle with a matrix of metal; but ivory and metal do not expand equally under the influence of heat and the blade is likely to be loosened. After all, "ivory is not such an expensive material that one cannot occasionally replace a broken handle without a sigh." The sacrifice is not great compared with perfection in operating. The ivory handle remains the best for the most delicate instruments, while aluminum may serve for the others.

The straight and slender blade of the Graefe knife will always be a favorite on account of the admirable facility in handling it. This is due to the fact that we practice successively the puncture, the counter-puncture and the section; while, when the point of the triangular knife (Beer's) reaches the point of counter-puncture its cutting edge is already well engaged in the cornea and the section is accomplished almost simultaneously with the counter-

punctures. The keratome makes a cleaner wound in iridectomy than does the Graefe knife, for every change in the plane of the latter makes a corresponding change in that of the wound and an irregular wound heals less rapidly than one made accurately in the same place. It is necessary to watch carefully the progress of the Graefe knife through its whole extent if we would make a section as clean as our predecessors made with the triangular knife.

The scissors furnished in boxes of ophthalmic instruments are usually too large and clumsy. The last phalanx of the thumb and of the ring finger should be inserted in the rings while the index rests upon the crossing of the branches. Held in this way by the most sensitive parts of the fingers, the scissors become a delicate sound of the tissues with which they are brought in contact. If the handles are too long the operator is obliged to extend the index finger, a position which impairs the lightness of movement of the hand. The blades of strabismus scissors are often too long, as we almost always use only the extremities in cutting. Generally the points should be blunted and they *should cut sharply to their extremities.* The closure of the branches by a screw, which has given place to an arrangement that affords greater facility in cleaning, holds them closer in position.

[The Editor's experience of the particular instruments he uses coincides so closely with Landolt's remarks that he strongly advises his readers to consult the original article of which the foregoing is an inadequate abstract.]

An Intraocular Powder Introducer is the invention of Mark Stevenson.[1] He says in its use one is easily able to see how much powder is introduced as the amount present can always be observed. Little or nothing can be known about a fluid except the amount injected, as some or all may escape. Powders are not washed out of the eye so readily as a fluid. The latter may flow out of the eye in a few minutes with the aqueous and the operator can not ascertain how much remains. The powders used dissolve slowly, thus continuing their effect for some time. Discs or pencils are liable to act as foreign bodies and cause

(1) Ophthalmic Record, October, 1906.

irritation of the posterior surface of the cornea, the delicate iris, or the anterior capsule of the lens. For intraocular medication he prefers powdered iodol to iodoform.

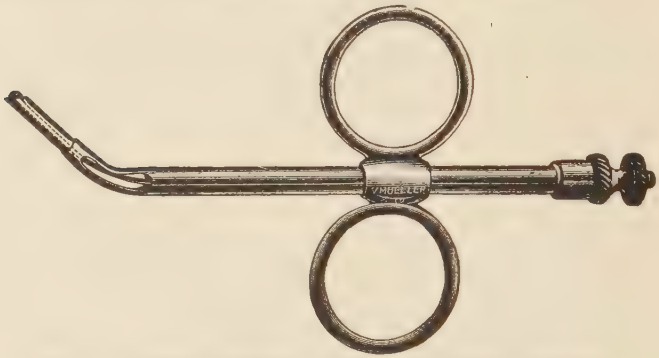


Fig. 21. Mark Stevenson's Intraocular Powder Introducer.

Improved Method of Mounting Eye Specimens in Formalin. A 5 per cent. solution of formalin has, according to Priestley Smith,[1] certain advantages over glycerin jelly *for the mounting of ophthalmic specimens:* it is more transparent and absolutely colorless; it keeps the specimen in a condition suitable for section-cutting at any future time; it is prepared without difficulty. The writer described a method of formalin-mounting in 1897, but found that such preparations spoiled before long as a result of entrance of air.

He now describes an improved method. The vessel employed is a square, upright, stoppered bottle, the neck of which is as wide as the body. The divided eye is placed upright against one side of the bottle and is held in position by a background of the thickest white drawing paper, in which is cut a round hole to receive the back of the half eye. The space behind the paper is packed with small bits of absorbent cotton. The bottle is filled with 5 per cent. formalin solution; it is tall enough for any air remaining in it, or entering subsequently, to be well away from the specimen even when the bottle is held in a sloping position. The height gives room for a label above the specimen.

(1) Ophthalmic Record, March, 1906.

An Intraocular Irrigator. This apparatus, designed by Greenwood,[1] consists of a glass bottle with a connecting rubber tube. The latter passes through a light metal handle, which is perforated near the end to enable the operator to compress the tube with his finger and regulate

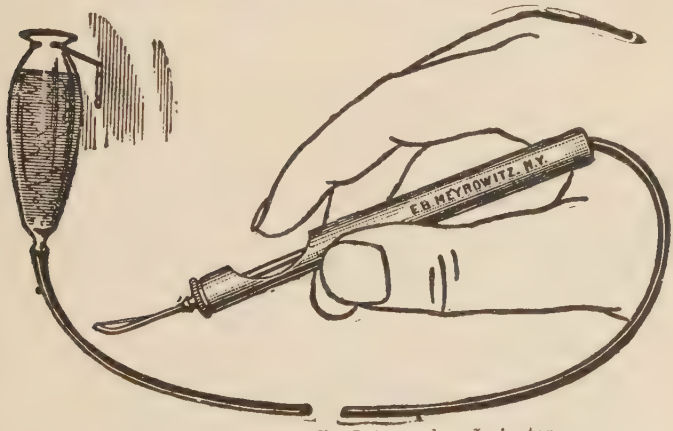


Fig. 22. Greenwood's Intraocular Irrigator.

the flow. The irrigating tip is attached to the end of the handle. This tip is round and bent to enable its being readily passed into the anterior chamber. A small rod spans the convexity of the bend, which serves to hold up the flap, thus enabling the return flow of fluid and cortical masses to escape readily.

Some Foreign Body Instruments. Two foreign body instruments are illustrated in the text, both designed by Todd.[2] One is provided with a V-shaped and the other

Figs. 23 and 24. Todd's Spuds for removing Foreign Bodies from the Eye.

(1) Ophthalmic Review, July, 1906.
(2) Ophthalmic Record, May, 1906.

with an U-shaped trough. He claims these instruments pick up and retain the foreign body with greater ease than the usual instruments on the market.

A New Lacrimal Syringe. This syringe, invented by Wilder,[1] has a glass barrel partially encased in a metal

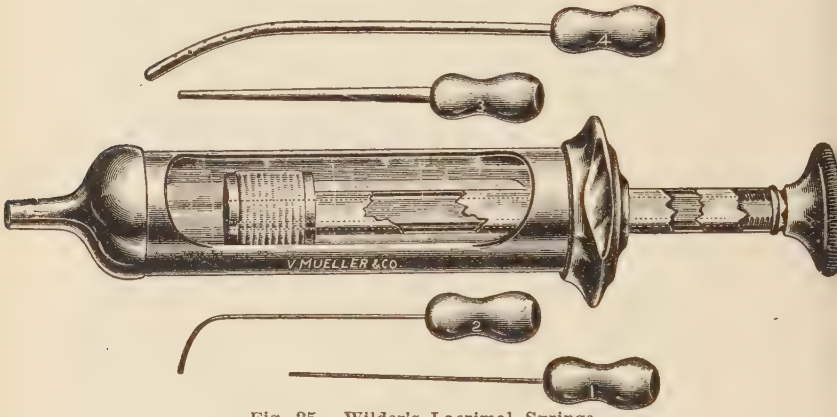


Fig. 25. Wilder's Lacrimal Syringe.

jacket. The piston is made of wrapped asbestos string, and expands by turning the piston rod upon a milled screw. It can be boiled and the piston is easily replaced when worn out.

OCULAR THERAPEUTICS.

Bier's "Congestion Hyperemia" Treatment in Eye Diseases. *This treatment is applicable only to persons up to 40 years of age, in whom disease of the heart and circulatory system can be excluded.* Cases where there is a deep-seated inflammation of the eye (iritis, iridocyclitis, iridochorioiditis acuta) must be excluded. The treatment was used in Renner's[2] five cases of parenchymatous keratitis, in phlyctenular conjunctivitis and in ulcus corneæ. In each case the duration of the treatment was 6 to 12 hours daily during 2 to 4 weeks. In one case of parenchy-

(1) Ophthalmic Record, January, 1906.
(2) Wien. Med. Blätter, Feb. 1, 1906.

matous keratitis after four weeks of treatment vision improved from 2/200 to 5/10. In none of the cases was any injurious effect of the treatment noticeable.

In order to *localize the constricting action to the eye,* Hesse[1] devised an apparatus similar to the artificial leech. The cup fitting to the ocular region is, by means of a tube, connected with a balloon, by which suction is produced. Hesse saw good results from its application in serpent ulcer, the last of which is reported in detail. The suction hyperemia was applied for from five to thirty minutes twice a day, and the ulcer healed in two weeks.

[There are in the market several convenient and effective instruments for the production of ocular hyperemia. Two of these, Pynchon's pump and the Victor suction apparatus, have been used with much satisfaction by the Editor and his associates.]

Local Anesthetics and Other Remedies. *Alypin and stovain are new local anesthetics.* The former resembles holocain, but is not very poisonous and can be used hypodermically. Stovain, in 4 per cent. solution, causes smarting and congestion. Marple[2] says it must never be injected hypodermically with adrenalin, as gangrene may follow.

Argyrol is considered by the author to be inferior to nitrate of silver in gonorrheal ophthalmia.

Reports upon *Romer's pneumococcus serum* in ulcus serpens are favorable. In desperate cases, which would surely do badly, it has suddenly turned the disease toward recovery.

The reports upon the use of *radium for epithelioma of the eyelid and for trachoma show a number* of prompt and satisfactory cures. The *x-ray in these* conditions has failed to make good the predictions of its most sanguine advocates.

Dionin in Ophthalmic Practice Hinshelwood[3] gives the result of further experiences with dionin and is enthusiastic about *the powerful analgesic action of this remedy in iritis, iridocyclitis, glaucoma, ulcer and keratitis.* He refers to a previous communication in which he pointed out the superiority of holocain over cocain as free

(1) Centralbl. f. Prakt. Augenheilk., p. 167, 1906.
(2) Ophthalmic Record, September, 1906.
(3) Brit. Med. Jour., May 12, 1906.

from all dangers of the latter and in relieving the deep-seated pain of ocular disease. Dionin is considered as superior even to holocain as an analgesic.

A careful series of comparative experiments were carried out in the hospital with three solutions—5 per cent. cocain, 1 per cent. holocain and 5 per cent. dionin—in order to determine the degree and duration of the relief afforded to the patient from the pain attendant upon ocular diseases. Both as regards the degree and the duration of the relief afforded, dionin was found the most powerful agent, next to it holocain, and a long way inferior to both, cocain. The dionin drops or ointment may be used freely every two, four, six or eight hours, according to the severity of the pain and the effect produced. It is an agent which can do no harm, and hence its great value.

The writer reports excellent results in the use of dionin in a class of cases in which it is often very difficult to give the patient any considerable measure of relief—those met with chiefly in neurotic and neurasthenic patients, in which a constant feeling of soreness and discomfort in the eye is complained of even apart from use. No disease or abnormality may be discoverable on careful examination, and yet the patient constantly complains of the feeling of soreness. In these cases the use of weak dionin drops (1 to 2 per cent. at most) is exceedingly grateful to the patient and gives considerable relief to the symptoms. The drops should be used three or four times daily. The burning sensation at first experienced after instillation will rapidly disappear, and after a few days no discomfort will be experienced.

He speaks of the valuable property of dionin of clearing up opacities of the cornea and of causing the disappearance of corneal infiltrations; for the clearing up of opacities an ointment is used, beginning with 4 grains to the ounce and gradually increasing to 12 grains to the ounce, and employing massage of the cornea through the closed lids. In keratitis with much infiltration, the writer combines atropin with 1 or 2 per cent. dionin; when the inflammatory symptoms have subsided, the atropin is stopped, but the dionin is continued for a considerable time.

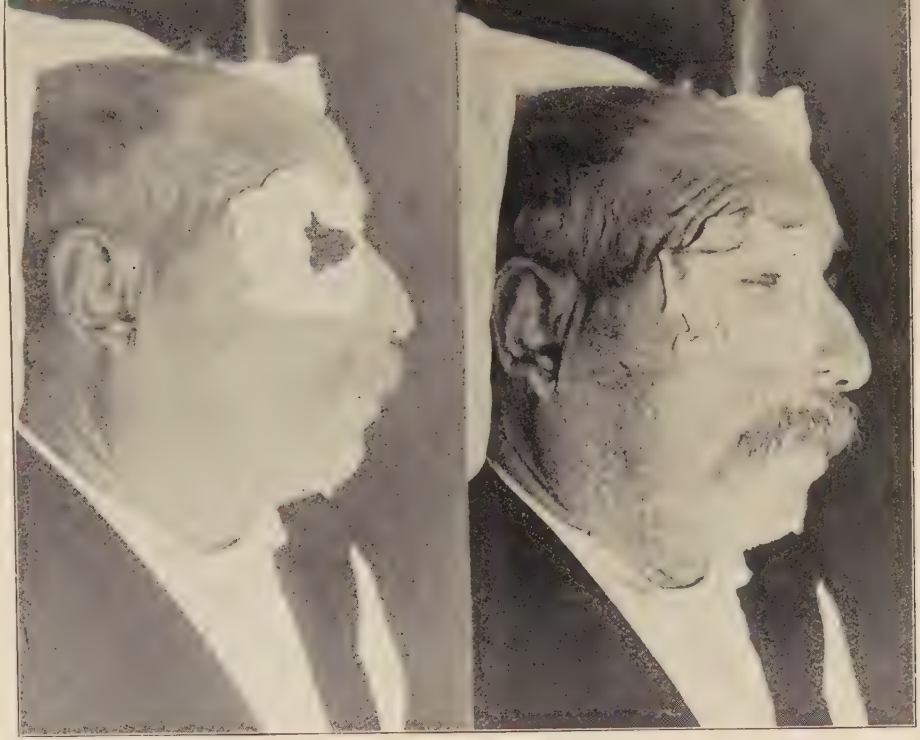


PLATE XI.

Showing "dam" about the eye, inside of which fluids may be applied to the eyeball and conjunctival sac (Myles Standish). (Page 140.)

Dionin in Diseases of the Eye. *Dionin,* says Rutherford,[1] is especially valuable in relieving the pain met with in some cases of iritis, iridocyclitis, corneitis and glaucoma; before dionin was heard of, how frequently it was found necessary to give morphin hypodermically to allow the patient a good night's rest? In 2 or 5 per cent. solution, or as an ointment of the same strength, if used properly at close enough intervals, it will relieve the severest of eye pain. It dilates the pupil and increases intraocular tension, and is thus contraindicated in acute glaucoma. [The Editor has never seen any but good results follow its exhibition in acute glaucoma.] The relief afforded the patient by dionin is also longer in duration than that from other ocular analgesics, such as cocain and holocain.

In *corneitis* or *ulcer,* by means of its powerful lymphagogic properties, dionin, combined with atropin, relieves pain and hastens absorption of the corneal infiltrate. After the ulcer is entirely healed the author inserts into the lower conjunctival cul-de-sac a little dionin ointment and then massages the cornea through the closed eyelids. He employs, at the start, ointment, 2 per cent., and gradually works up to 5 per cent. He emphasizes that the more recent the opacity the better the result.

In the acute form of *iritis* and *iridocyclitis,* dionin, combined with atropin, besides relieving the pain, assists the latter drug in its dilation of the pupil. In old cases of iritis, where posterior synechiæ are present with a plastic exudate over the pupillary area, there is no adjuvant to atropin like dionin. It is also very useful in postoperative iritis and iridocyclitis. The author states that his experience in acute primary glaucoma has been very limited, but, combined with atropin, he has used it with splendid results in cases of secondary glaucoma due to synechiæ.

Subconjunctival Injections in Ocular Therapeutics. Once more Lamb[2] advises the more extensive use of subconjunctival injections of normal salt solution in diseases of the eye. The author believes that these injections act by flushing out the lymphatic vessels, thus allowing a new lymph supply to flow through. He states that they are indicated in infections, acute or chronic,

(1) Canadian Practitioner, October, 1906.
(2) Wash. Med. Annals, September, 1906.

primary or secondary, from without the body or through the blood and lymph, as rheumatic, syphilitic or tubercular, and are contraindicated by venous and by lymphatic stasis, as they can not properly traverse the superficial channels to get to the deeper ones. If the superficial channels be cleared by the use of dionin and hot applications, then the injections may be given.

Some Injuries to the Eye Following Subconjunctival Injection of Bichlorid and Salt Solution. The following *objections to the use of subconjunctival injections of bichlorid* are urged by Alexander:[1]

1. Subconjunctival injections of bichlorid were often badly borne. Eyes often remained in an irritable condition after complete cure of the condition for which treatment was instituted.

2. There is no proof that in subconjunctival injections the bichlorid reaches the interior of the eye, to act there as a disinfecting agent.

3. Observations on the eye, both of the lower animals and of the human being, show that bichlorid acts upon the lymph currents only in its capacity as a salt by exciting currents of diffusion.

These observations led to the substitution of common salt for the bichlorid, and equally good results were reported, with fewer complications.

The author gives the clinical histories of three cases in which complications followed the injection of NaCl. In the first case adhesions occurred between the conjunctiva and sclera at the site of puncture. In the second case there was extensive necrosis of the bulbar conjunctiva, followed by peculiar changes in the cornea and lens. The third case also showed peculiar opacities in the cornea and lens, which later disappeared.

The Bactericidal Action of Compounds of Silver. A most important piece of research work, under the care of Marshall and Neave,[2] was undertaken at the request of the Therapeutic Committee of the British Medical Association. Owing to the extensive use of silver compounds as bactericidal agents in certain diseases, it seemed to the committee desirable that a comparison of the value of

(1) Archives of Ophthalmology, January, 1906.
(2) Brit. Med. Jour., Aug. 18, 1906.

these compounds should be made by disinterested observers. For this purpose all the silver compounds in common use were bought from a retail pharmacist. The percentage of silver in each was determined and found to be as follows: Collargol, 86.6; silver fluoride, 81.7; silver nitrate, 63.6; itrol, 60.8; actol, 51.5; argentol, 31.2; ichthargan, 27.1; argyrol, 20.0; albargin, 13.4; nargol, 9.6; largin, 9.4; novargen, 7.9; protargol, 7.4; argentamin, 6.4; argonin, 3.8. These results were used in preparing the various solutions. Each solution was made to contain a definite percentage of silver. This appeared to be the only method available for comparison, as equimolecular solutions could not be employed owing to the composition of many of the substances being unknown.

The results are given as obtained with a mixed culture and with a pure culture of *Staphylococcus pyogenes aureus*. The antiseptic action was determined in two ways: (1) By observing the time taken by minced cooked beef to putrefy in presence of solutions of silver compounds of known strength; (2) by inoculating an agar mixture.

This important paper concludes with the following summary: The experiments show that as regards bactericidal action the various silver compounds investigated fall into three groups: (1) Those which are powerfully bactericidal; (2) one—nargol—much less powerfully bactericidal; (3) two—argyrol and collargol—which possess practically no bactericidal action whatever. The first group includes most of the substances investigated, namely, silver nitrate, silver fluoride, actol itrol, argentamin, argentol, albargin, argonin, ichthargan, largin, novargan and protargol. The bactericidal action of these in solutions containing the same percentage of combined silver is closely similar, and it is practically impossible to place them in any order of activity which would be true under all circumstances.

Experimental Study on the Bactericidal Power of Various Silver Preparations. From an experimental study of the bactericidal power of various silver preparations undertaken because of the more or less uncertainty concerning the efficiency of these remedies, G. S. Derby[1]

(1) Boston Med. and Surg. Jour., Sept. 27, 1906.

concludes that the silver preparations tested, with the exception of argyrol and collargol, are efficient bactericides in the laboratory. Their bactericidal action and that of Lugol's solution and of corrosive sublimate is markedly retarded by the addition of a serum, such as hydrocele fluid or bovine blood serum. It seems probable that on this fact largely depends the comparative inefficiency of antiseptics.

Silver Preparations in Conjunctival Disease. Two hundred and one cases of ophthalmia neonatorum with clear cornea were treated by Myles Standish[1] with argyrol and 2 per cent. only had subsequent corneal infection. Fifty-two cases of gonorrheal ophthalmia in adults were treated by argyrol with 42 per cent. subsequent corneal involvement. In the adult cases a putty dam was built up about the eye in several cases, and a pool of 25 per cent. argyrol was made over the eye and retained there for from 10 to 25 minutes while the patient opened and shut his lids. His results have been better with argyrol than with any of the new silver salts. He concludes that the modern silver preparations are efficient in the control of gonorrheal infection of the conjunctiva.

Guaiacol in Ophthalmic Therapy. Tersen[2] claims that the antiseptic, alterative, anesthetic, analgesic action of guaiacol is of service in diseases of the eye. As an application to the skin a 10 per cent. solution in oil or glycerin, either alone or in combination, in oily solution, with camphor or menthol, will be found useful in herpes zoster, furunculosis, phlegmonous dacryocystitis, etc. As a conjunctival application he employs a mixture of copper sulphate and guaiacol, each one part to 20 parts of glycerin. In burns he uses a solution of atropin (the alkaloid) in sterile chemically pure oil to which may be added guaiacol, menthol and camphor 1/20. Internally and intramuscularly it is of use in scrofulous tuberculous and syphilitic eye affections.

Alypin in Ophthalmology. *Alypin,* for which we are indebted to Impens (1905), *is a new local anesthetic derived from glycerin.* It is a white crystalline powder, very soluble in water, and can be sterilized by short boil-

(1) Ophthalmic Record, August, 1906.
(2) Die Ophthal. Klinik, No. 2, 1906.

ing if slightly alkaline. It may be rated with cocain—possessing many advantages with few inconveniences. Cocain instillations or injections rapidly produce insensibility of the tissues but the drug is relatively toxic. Anesthesia of the cornea and conjunctiva is had from alypin in a few minutes when in 1, 2, 4 or 5 per cent. solutions, more rapidly in stronger per cent. The anesthetic effects last sufficiently long, 10 to 15 minutes or longer, when the instillations are repeated.

With regard to interstitial anesthesia, True[1] has *compared the effect of both alypin and cocain of the same strength* and is unable to find any appreciable difference, the toxic effect being less from alypin than cocain. With alypin there is no mydriasis, even with strong solutions. Tonus and accommodation are not changed by alypin. It is important that the solutions should be neutral, acid ones being irritating.

Zimmerman[2] reports his *experience with alypin* (5 per cent.) *as a local anesthetic* after using it systematically for several weeks in all kinds of operations. In those involving the globe it was combined with adrenalin solution, 1/1000. Subcutaneous (not cutaneous) injections of 1 per cent. solutions of alypin, with or without adrenalin, rendered extirpations of the tear sac painless. For enucleation, two syringes full of alypin-adrenalin, injected at four different places into Tenon's space, proved sufficient after previous instillations into the conjunctival sac. Even the cutting of the optic nerve caused no inconvenience.

Zimmermann concludes that alypin is undoubtedly the best substitute for cocain, as it possesses almost all the advantages and lacks the disadvantages of cocain. Its vasodilatatory properties, dreaded by several authors, may be obviated by an admixture of adrenalin. Alypin is cheaper than cocain and is urgently recommended.

Alypin as a Consulting Room Anesthetic. Kirchner[3] believes this agent to be more rapid in its action than cocain; and, because of the absence of action upon the iris and Müller's fibers, particularly useful in private practice.

(1) Revue Générale d'Ophtal., March 31, 1906.
(2) Klin. Monatsbl. f. Augenheilk., p. 262, 1906.
(3) Die Ophthal. Klinik, April 25, 1906.

He believes that no one anesthetic meets all of the requirements of private practice and still prefers cocain for intraocular operations because of its constricting effect upon the blood vessels.

Chlorate of Potash in Ophthalmology. Three per cent. solutions of chlorate of potash in all forms of conjunctivitis, with or without ulcers at the corneal margin, are recommended by Koster.[1] The drug acts as an astringent and mild antiseptic. Bacteriological investigations showed that cultures of various kinds of pathogenic microbes from the mucous secretions of diseased eyes, which developed rapidly on agar agar, did not grow when a 3 per cent. solution of chlorate of potash was added. Koster saw no evil effects, but is still in doubt whether its continued use may in some persons set up a disposition to the formation of hordeola.

One of his assistants also observed in a scrofulous child croupous pseudomembranes and swelling of the conjunctiva after washing the eyes with a 3 per cent. solution of chlorate of potash.

COMPARATIVE OPHTHALMOLOGY.

The Eyesight of Fish and Vision Under Water. As is well known, an eye below the surface of water sees the sky compressed into a comparatively small area of light, the center of which is always immediately above the observer, the appearance being as if the pond were covered with an opaque roof with a circular window cut in it. Surrounding objects, says R. W. Wood,[2] appear around the rim of the circle of light, but of these we are unable to get a clear notion, since our eyes are not adapted to clear vision under water. By immersing a camera in water and photographing the circle of light we can get an idea of how these things appear to the fish. A number of interesting pictures were obtained with a device equivalent to a lens having a working angle of 180°. A pin hole in place of the lens gives even better definition. The apparatus in a horizontal position represents things as seen by a fish look-

(1) Zeitschr. f. Augenheilk., p. 524, 1906.
(2) Johns Hopkins University Circular, April, 1906.

ing through the glass sides of an aquarium. The cone of light entering a fish's eyes has an aperture of about 96°, but the rays within it came originally from a cone of 180°. Thus, all three sides and the complete ceiling and floor of a room may be photographed, or when placed at a point where four streets meet at a right angle we can get a view looking down any three streets, the view including the ground up to the base of the tripod and the sky from the horizon to the zenith. Suspended from a balloon, it will photograph the entire surface of the earth out to the horizon in all directions. There is a good deal of distortion near the circumference of the circular picture.

Persistent Hyaloid Artery in Both Eyes. In one eye Shoemaker[1] found an unusual example of this fetal vestige. It presented the appearance of a large, freely movable, tubular structure. Surrounding the apparent mouth of the tube, and running spirally around it backward, is a fine, sharp, glistening strand. The proximal end is close to the lens. The distal end disappears abruptly and apparently has no attachment. Running from the forward end toward the ciliary body are three fine threads resembling guy ropes, which alone prevent this from being a liberated persistent section of the hyaloid artery.

Extensive Remnants of the Fetal Ocular Vessels. Ruewandl[2] observed in a man, aged 31, not only the stem of the hyaloid artery, but also its distribution on the posterior capsule of the lens in form of a network of fine whitish threads, and the remnants of two blood vessels of the vitreous branching off from a swelling of the stem of the artery, one upward and outward, the other downward and inward.

[The distribution of the central vessels described above is normal in many reptiles.—Ed.]

Human Ocular Movements Similar to Those Found Normally in the Ungulates. Cases which show the preservation of ocular functions existing normally in some animals are presented by W. L. Phillips.[3] Reports are given of two cases, each presenting essentially the same conditions. Mr. X. can see 20/20 with each eye separately

(1) Annals of Ophthal., April, 1906.
(2) Zeitschr. f. Augenheilk., p. 245, 1906.
(3) American Medicine, March 24, 1906.

and without glasses. It is possible for him to fix with both eyes, to turn either one out slowly and back again to double fixation without disturbance while reading. He is also able to converge both eyes and move his eyes simultaneously to extreme divergence. Besides this, he can move them both to the extreme right, or to the extreme left, or, by holding one in any position, from extreme divergence to extreme convergence, look at the side of his nose with the other. At no time since birth did he have double vision, and it is not produced even by the use of strong prisms. He finds that monocular vision is more restful than binocular vision, because of less head rotation. In each of these positions he has both eyes in focus, seeing with the one in front and the other at the side. The second patient could with one eye see to set type and at one side read proof with the other without the necessity of movements of the eyes.

The Eyes and Eyesight of Birds. During the past five years Casey Wood[1] has been engaged in a study of *Comparative Ophthalmoscopy* and has more recently confined his observations to *birds as offering, perhaps, a more attractive and certainly a less explored field than that of mammalian ophthalmoscopy* already fully covered by Lindsay Johnson. In this work he has had the co-operation of A. W. Head, F. Z. S., the colored plates reproduced in this volume being from the brush of that artist, illustrating a preliminary paper on the Eyes and Eyesight of Birds. After the examination of a large number of representative avian fundi, with their corresponding fundus pictures, the author may venture upon another article giving further descriptions of his Ophthalmoscopic work.

The Ocular Fundus of the Kiwi or Apteryx Mantelli (see Colored Plate I). This is the background of a bird belonging to the sub-class Ratitæ, or birds with functionless wings. It is one of the oddest of the Australian birds —something like a thin little Cassowary with thick legs, no visible wings, and a long bill like a snipe. The nostrils are placed at the very tip of this slender beak, which the bird deeply plunges into the soft ground, smelling about for worms, which, when discovered, are drawn out and eaten. Kiwis are nocturnal in their habits and for that

(1) Ophthalmology, April, 1907.

COLORED PLATE I.

Fundus of the wingless Kiwi (Apteryx) showing the conical pecten. Painted by A. W. Head, London, to illustrate Casey Wood's article on the Eyes and Eyesight of Birds. See chapter on Comparative Ophthalmology

reason are rarely seen by visitors to our zoological parks and gardens. If aroused from their straw during the daytime they open their mouths several times in long-drawn and very human yawns and then fall asleep again.

The fundus of the Apteryx in comparison with that of most carinate birds suggests its nocturnal life. Indeed, all animals that prowl, run about or feed at night-time have brilliant yellow, orange or yellow-red fundi.

The almost uniform red, mottled background of the Apteryx shows no blood vessels in his retina whatever. The choroidal pigment is less plainly seen in a concentric area surrounding the remarkable optic nerve entrance. Here the brilliant, white, round disk surrounded by short, opaque nerve-fiber rays is not entirely covered by the fenestrated base of the long, large and regularly conical pecten which reaches almost to the lens. If one were allowed to stretch his imagination, the combined picture of pecten and nerve-head might be said to resemble a black rubber teat from a nursing bottle, partly stretched over a white sea-urchin. How the Kiwi's pecten could have remained undiscovered for so many years is difficult to explain, except that it emphasizes the difficulties in the way of a satisfactory exploration of birds' fundi in general and the differences between the erect, vascular, functionating pecten of the live bird and the blanched specimen that may easily escape recognition after death. To Mr. Head unheeded by text-books—that every bird, the Kiwi included, has a well-developed pecten.

The eyesight of the whole owl family should be of consuming interest to the ophthalmologist because of the almost human arrangement of his ocular apparatus. First of all, the owl has his eyes placed in front of his skull, looking straight forward, just like man and the other Simiæ. Like the higher apes, also, he has a well-defined macular region and binocular vision. At the outset let it be said that the popular notion regarding the owl's daylight vision is incorrect. That he does see better at night than other birds is quite true, as the coloration of his fundus proves, but that he is blind by day is far from the truth. From observations made by the author in the London Zoo, from the experience of the keepers and other observers, we may conclude that almost all the owls have good vision both by

day and night. As the owl has practically no nocturnal bird enemies he does not need to see behind him. His ocular apparatus is accordingly arranged to intercept with the highest degree of efficiency all the light rays, however faint, that fall upon his retina from the front. He is thus able to sit at night entirely motionless and watch for his prey without exposing himself to view.

The *Background of the Tawny Owl's Eye* (see Colored Frontispiece) at first glance reminds one of the light-haired Caucasian. It is yellowish-red, with the choroidal vessels conspicuous. The macular region is a round, red disk surrounded by a bright reflex ring of silver-gray. The latter is often so marked that it resembles an exaggerated "bull's-eye-lantern" macula—occasionally seen in human eyes—and the reflex may be so dazzling as to interfere with a clear view of the region itself. Surrounding the red macula is a very large concentric area (which reaches to the nerve-head) that looks like a gray haze. There are few traces of choroidal vessels here; probably we look at only the translucent retina against the underlying choroidal pigment. The optic disk is a long, whitish, ovoid figure surrounded by the reddish choroidal vessels. Springing from the whole length of the papilla and almost covering it is the pecten. Seen with the ophthalmoscope this organ presents the appearance seen in the picture—a smooth, black, corrugated, grub-like body slightly pointed at the papillary end. Viewed laterally the owl's pecten closely resembles the dorsal view of a partially clenched hand.

Below both papilla and macula is a rather large area abundantly supplied with large choroidal vessels, between which are masses of pigment. On the other hand, the nerve-head occupies the center of a smaller, much lighter, yellower field. On the whole, this nocturnal bird of prey shows a background such as we would expect from what we know of the fundi of mammals of similar habits. The refraction of this owl is about 3 dioptres of simple hypermetropia.

From studies of the Eyes of Birds the author believes he is justified in drawing the following conclusions:

1. The highest expression of vision, including the most

varied and widest range of accommodation, is found in bird life.

2. The owls possess binocular sight and their eyes in many other respects resemble those of man.

3. Probably every bird—carinate and acarinate—possesses a pecten. This is quite as true of the Apteryx (long thought to be without one) as it is of our common wild birds. The size, shape and relations of the pectinate body to the other ocular structures are so varied, and their appearances, as determined by the ophthalmoscope during life, are so constant in each wild species that the background picture of a particular wild bird furnishes certain data for a classification of quite as much value as the variations in any other organ.

4. The refraction of most wild birds is simple hypermetropia; of domestic species hypermetropia, or myopia, with astigmatism.

5. The post-mortem appearances of birds' eyes are decidedly misleading, especially as to the shape and size of the eyeball and the relations of the parts in the interior of the globe.

6. The range and rapidity of accommodation in birds far exceed that of man or other animals, and the accommodative and refractive apparatus is much more complex than in other sub-kingdoms.

7. The areas of distinct vision in birds are peculiar to them. In a single fundus may be present one or two foveæ, or one, two or three visual areas, thus enabling the bird to obtain the sort of vision most suited to its needs.

8. The color sense in birds is very acute, as shown by the great preponderance of cones in the retinal elements.

9. A number of congenital anomalies in man are but the evolutionary remains of birds' organs. For example, the posterior lenticulo-capsular opacities, described by Mittendorf, and the human persistent hyaloid artery are undoubtedly unabsorbed pectinate tissues.

10. An extended study of the ocular fundi of birds may not only throw light upon the classification of doubtful species and so prove useful to the zoologist, but may possibly illuminate some of the problems of human ophthalmology.

THE EAR.

THE EAR.

ANATOMY AND PHYSIOLOGY.

Those who have given the subject much consideration are inclined to agree with C. J. Blake,[1] who believes that otology still presents a broad and alluring field for original research and clinical investigation. The slowly progressive changes in the middle ear, gradually inhibiting its function of sound transmission, the reflex relationships between the middle ear and labyrinth and other organs, the bearing which the general systemic condition has on the blood supply and the transmission and perceptive functions of this complex organ, the elucidative information which may be obtained from it in eliminative diagnosis, emphasizing the statement that the ear is a small window through which it is possible to get a broad view if one only gets close enough to it, all point to otology as a distinctive department of laboratory and clinical research sufficient in itself to command the study of a lifetime, and scientifically remunerative, both in itself and in its centralizing relationship to other branches of investigation.

Viewed from the scientific standpoint alone the relationship of otology to rhinology is mainly that which concerns the middle ear and has to do with questions of blood supply, of variations in intratympanic atmospheric pressure and in the consideration of the nasopharynx as a reservoir of possibly mechanically invasive micro-organisms. In the early days of clinical otology the regions of the posterior nares and of the nasopharynx were practically unknown, or disregarded fields. The part played by micro-organisms in the causation of diseases, surgically remediable was yet to be discovered, the importance of the integrity of the nose and nasopharynx to the proper aera-

(1) Journ. Amer. Med. Assoc., Dec. 1, 1906.

tion of the tympanic cavity was unappreciated, and cases of persistent aural symptoms, dependent on the pressure of obstructive growths in the nasopharynx, sufficient to produce also the now well known facial symptoms, passed by on the streets and through the out-patient departments of the hospitals unnoticed.

Dundas Grant[1] asks us as otologists to remember that the ear is primarily an organ of hearing and to cultivate the accuracy and patience in examination and the dexterity and delicacy of manipulation upon which our success in relieving our patients and in making our own reputations so much depends.

George E. Shambaugh[2] has made a study of the blood supply of the inner ear, especially in its relation to the circulation in the middle ear. The points of special interest in the study of the circulation in the inner ear group themselves under the following headings:

1. How is the arterial blood brought to the labyrinth?
2. How is the venous blood carried away from the labyrinth?
3. What is the distribution of the main arterial and venous trunks within the labyrinth, especially in regard to their relation to the supply of the several areas in the labyrinth of highly specialized structures including the nerve endings?
4. What relation exists between the blood-supply of the membranous labyrinth and endosteum and the blood-supply of the bony shell or capsule of the labyrinth? Do the blood vessels of the membranous labyrinth communicate with those in the tympanic cavity?

The arterial supply is brought to the internal ear through a single vessel, a branch of the basilar artery which enters the labyrinth along with the auditory nerve through the internal auditory meatus.

Regarding the manner in which the venous blood is carried away from the labyrinth there exists a diversity of opinion.

In the detail study of the blood supply in the labyrinth of the pig, the sheep and the calf, Shambaugh found that a single vessel, the vein of the aquæductus cochleæ, drained

(1) Brit. Med. Jour., Sept. 8, 1906.
(2) Archives of Otology, No. 1, 1906.

the blood from the entire labyrinth. No vein was found in the internal meatus nor yet accompanying the aquæductus vestibuli which drained blood from the labyrinth. A single exception to this arrangement was found in the labyrinth of the calf, where as an anatomical variation the vein of the crus commune was occasionally found leaving the labyrinth along the aquæductus vestibuli.

A striking peculiarity in the blood-supply of the labyrinth is at once apparent that whereas the arterial supply is brought to the labyrinth by way of the internal meatus the venous blood leaves the labyrinth, at least for the most part, at a point distinct and separate from this, namely, along the aquæductus cochleæ.

A study of the disposition of the several branches of the labyrinthine artery brings out the fact that the several parts of the labyrinth are supplied through terminal arteries. The areas that are in this manner isolated by their arterial supply from the rest of the labyrinth are as follows:

1. The utricle, together with the horizontal and superior semicircular canals. These are supplied through the first branch of the labyrinthine artery.

2. The ampulla of the posterior semicircular canal, supplied entirely through the second branch of the labyrinthine artery.

3. The saccule, supplied by several arterial branches distinct from the remainder of the vestibule.

4. The cochlea, supplied as a whole by branches which are distinct from those that go to supply the vestibule and semicircular canals, while the several parts of the organ of Corti throughout the coils of the cochlea are supplied by terminal arteries which isolate distinct though small areas from the adjoining parts.

An important question is whether the ramifications of the labyrinthine artery which supply the endosteum of the labyrinth penetrate the bony capsule. Since the blood-vessels of the periosteum are known to supply the underlying bone, we would expect perhaps to find the blood-vessels of the endosteum lining the cavities of the labyrinth also supplying the surrounding bony capsule. This view has found expression through Politzer, who believed he could demonstrate communications between the blood-ves-

sels of the mucosa of the cavum tympani and those found in the membranous labyrinth and endosteum.

In his study of this problem in the ear of the calf Shambaugh was able to demonstrate that the branches of the labyrinthine artery supplying the endosteum penetrate the bony capsule at a number of distinct points, chiefly about the base of the cochlea and about the vestibule, and that in the ear of the calf at least, communications appar-

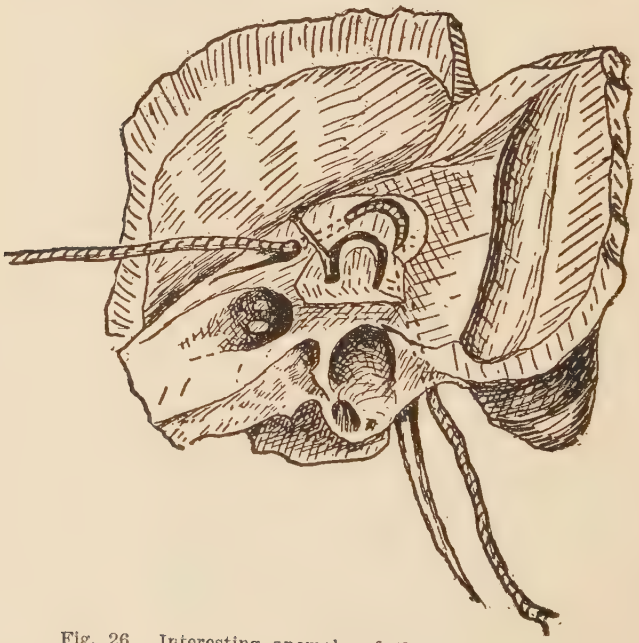


Fig. 26. Interesting anomaly of the facial canal.

ently do exist between the blood-vessels of the mucosa of the cavum tympani and those of the membranous labyrinth and endosteum.

The existence of such communications between the blood-supply of the labyrinth and that of its bony capsule may be of considerable clinical importance. In the first place, in the condition known as otosclerosis, where a change in the ivory-like bone of the capsule to spongy bone takes

place, communications between the blood-supply of the capsule and the internal ear might result in a more or less pronounced alteration in the circulation of the inner ear, such as might account for the tinnitus which is such a constant symptom of this condition. In the second place, if communications exist between the blood-supply of the

Fig. 27. Interesting anomaly of the facial canal.

tympanum and that of the inner ear, this condition may have a far-reaching clinical significance not alone in connection with the suppurative processes in the tympanum but in the catarrhal processes as well. (See Plate XII.)

An interesting anomaly of the canal of the facial nerve is presented by Prentiss and Dean.[1]

In Figure 26 a thread has been passed through the facial canal. It is observed that the entrance is in the posterior surface of the petrous portion of the temporal bone rather than in the internal auditory meatus.

The canal passes cortically, dipping under the superior

(1) Annals of Otol., Rhin. and Laryngology, December, 1906.

semi-circular canal and in the same vertical plane turns, passing downward to terminate at the stylo-mastoid foramen. It therefore has no relation whatever with the middle ear or antrum.

In Figure 27 is shown a vertical section through the facial canal. Three-eighths of an inch above the stylo-mastoid foramen is observed the opening of a small canal which takes the usual course, passing above the foramen ovale and ending in the hiatus fallopii. Probably this is the passage of the large superficial petrosal nerve, the chorda tympani and the nerve to the stapedius muscle.

EXTERNAL EAR.

W. H. Haskin[1] reports a case of deformity of the auricle as a result of perichondritis following radical mastoid operation. At the time of operation the patient was suffering from furunculosis of the auditory canal, which Haskin thinks was the cause of the perichondritis.

[The editor has reported two cases of perichondritis following radical mastoid operation. In each of these cases the patient's health was greatly impaired and streptococcus infection was present in the inflamed auricle.]

In the treatment of furuncles of the auditory canal, A. Schoengut[2] has found pressure of great value.

He tampons the canal with a strip of bichlorid gauze 2 cm. wide, after due disinfection, and has found this very satisfactory in the majority of cases. The occasional failures have led him to try Bier's stasis hyperemia with a constricting band around the neck. His experience with thirty-four patients has convinced him that the method is very effective, if applied with care and is individualized. It is indicated in all acute inflammatory processes, especially circumscribed otitis externa. The prompt relief from pain is one of its greatest advantages.

Treatment of Diseases and Injuries of the External Ear. This subject is considered by A. Denker.[3] Congenital defects arising either from excess or imperfect formation of the parts are occasional results of improper develop-

(1) Annals of Otol., Rhinol. and Laryngology, March, 1907.
(2) Deutsche med. Wochschr., Vol. XXXII, No. 43.
(3) Deutsche med. Wochsch., Nov. 22 and 29, 1906.

ment. Detached pieces of cartilage may occur in the neighborhood of the external ear, and several auricles may occur on the same side. If these supernumerary parts constitute a deformity they can be removed without trouble. A frequent defect is congenital fistula of the ear, a fistulous opening in front of the tragus that is liable to be filled with macerated epithelium which may afford opportunity for infection or for the formation of retention cysts. The obliteration of these fistulæ is sometimes necessary and can be accomplished by excision or by the galvanocautery. Lack of defective formation of the external ear is usually associated with atresia of the external auditory canal and absence of the drum membrane. In case the other ear is normal it is possible to improve the appearance and restore some degree of hearing power by plastic surgery. The mastoid process is opened and a channel bored through into the tympanic cavity.

Mechanical injuries to the external ear commonly heal by first intention if they are carefully disinfected and the necessary stitches taken. This applies also to tears of the lobe from pulling out earrings.

Hematoma of the ear is best treated by daily painting with iodin or collodion, massage and application of a pressure bandage. The blood can sometimes be removed under antiseptic precautions with a Pravaz syringe.

The burning following freezing of the ear is alleviated by application of tinct. iodi with the addition of tinct. opii or by icthyol and oil of turpentine in equal parts. Perichondritis must be treated by the usual antiphlogistic measures, but if fluctuation occurs, long vertical incisions should be made, which should not be limited to the points where fluctuation can be determined, but should extend through the whole inflamed area. Necrotic cartilage and granulations should be removed with the sharp spoon; iodoform should be applied, and strips of iodoform or vioform gauze should be introduced, the external ear supported and the whole enclosed in a drying dressing. Phlegmon of the external ear should be treated in a similar way. Erysipelas demands the same treatment as erysipelas of the scalp. Noma, which is most generally fatal, is amenable only to total extirpation of the diseased area.

The most common affection of the external ear is eczema,

which is very obstinate at times and very liable to recurrence. The reason for this is the persistence of cracks behind the ear, or at the opening of the canal, from which a fresh attack arises. The source of the eczema should be carefully sought out, as it often depends on a small perforation, which being healed, the skin disease speedily disappears. Remedies are best applied on bandages, which prevents the patient from irritating the diseased area by scratching. The eczematous area should not be washed with water. It should be remembered that many drugs, like iodoform, orthoform, etc., are liable to provoke eczema. On discontinuing the drug the eczema heals by the application of simple remedies.

Among inflammatory affections the circumscribed form leading to furuncle and abscess is most common. The diagnosis is made early by observing the tenderness from pressure on the tragus, presence of fever which is commonly absent in case of a purulent discharge from the middle ear, and the preservation of hearing power, which must be tested by passing a small funnel of paper into the canal.

The diffuse infiltration of the first stage can be removed in many cases by alcohol or 10 per cent. aluminum acetate dressings. Small strips of gauze saturated with the solution are passed into the auditory canal and the whole external ear enveloped in the dressing, over which is placed an impermeable gutta-percha covering. This will frequently prevent suppuration and the tendency to formation of new furuncles, which is so manifest with aqueous dressings, is not seen. If abscess has evidently formed it should be opened by incision with a sharp knife, the cut being made deep enough to secure the outlet of the pus, as otherwise the patient suffers the pain without experiencing any relief.

Otitis externa crouposa is characterized by the occurrence of a fibrinous exudate in the canal and on the external ear. This should be carefully removed by a warm boric acid injection, the canal dried, and dry boric acid or iodoform insufflated. The severe pain which sometimes accompanies it should be relieved by ice applications and morphin internally.

Mycosis of the external ear is treated by cleansing with

boric acid solution and irrigation daily with 2 per cent. solution of salicylic acid in alcohol. A week's treatment is usually sufficient.

The following advice is given regarding the extraction of foreign bodies. First, make sure by inspection with the mirror that a foreign body is present. Then introduce oil if the foreign body is liable to swell. Try to remove the foreign body by repeated syringing. If these measures are unsuccessful only such physicians should undertake the removal of a foreign body from the ear as are masters of the use of the mirror and who understand thoroughly the topographic anatomy of the external auditory canal. In the case of children, and also in adults, where repeated unsuccessful attempts at extraction have been made, the extraction of an impacted foreign body should be made under deep narcosis.

Rupture of the membrana tympani may occur as the result of injury. In such case the opening should be protected from the entrance of foreign bodies or infection into the tympanic cavity by the placing of a sterile wad of cotton in the cartilaginous portion of the auditory canal. So long as suppuration is not present all touching of the drum membrane and the introduction of liquids of all kinds should be especially avoided.

Spurious Othematoma. Genuine othematoma consists of a tumor in the external ear containing blood often more or less altered in character. H. Vörner[1] reports a case closely resembling othematoma, in which the fluid consisted of lymph with various lymph corpuscles and endothelial cells. The examination of a piece of the wall of the cavity showed that it was lined with endothelial cells and was, in fact, a dilated lymph vessel. This observation shows that in rare cases a lymphangiectasis of the external ear may present the picture of an othematoma.

Herpes Zoster. D. T. Vail[2] reports a case of Herpes Zoster affecting the auricle. The patient, a tool maker, aged 29, left his shop while overheated and waited twenty minutes in the cold wind for a street car. Next morning he noticed his right ear was stopped up, accompanied by slight twinges of pain in this ear. At 10:30 o'clock the

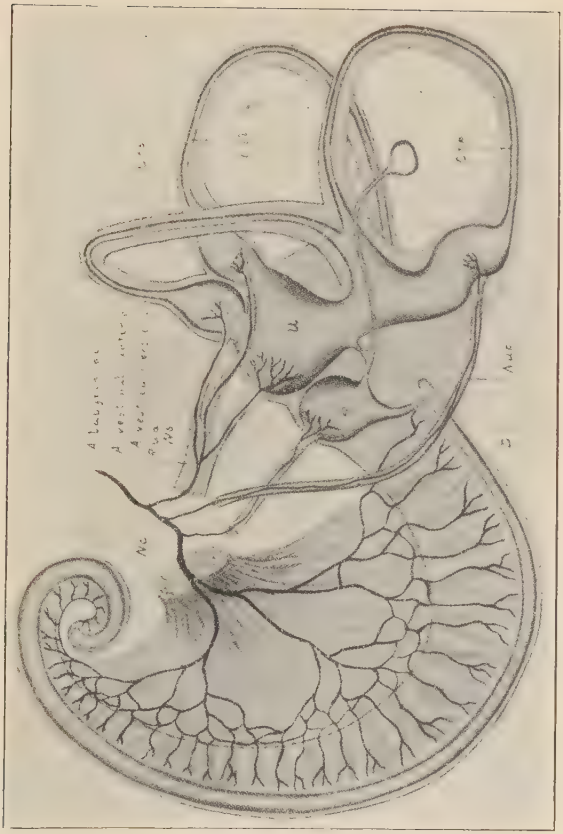
(1) Muenchen. med. Wochschr., Feb. 27, 1906.
(2) Laryngoscope, September, 1906.

following night he had sudden severe pain in the ear, and at 1:30 a. m. the pain had increased to an unbearable agony.

Examination revealed a normal drum membrane, but on the posterior wall of the auditory canal close to the membrana tympani was seen a large bleb slightly dark in color, as if it contained serum and a small amount of blood. The probe test showed that the bleb was raised epithelium and contained fluid. Cocain and adrenalin were used and the blister incised, a painless procedure, evacuating a quantity of blood-stained serum. The pain was not relieved in the least. Further examination revealed and exquisitely sensitive mastoid. Temperature, 98 degrees; pulse, 72. Thinking that there must be some middle ear involvement, the canal was thoroughly sterilized and the membrana tympani incised at the lower posterior attachment to the annulus, a distance of 8 mm. No fluid presented, and the canal was carefully plugged and the patient sent home supplied with four quarter-grain morphin tablets, with the instruction to take one and repeat in an hour or two if not relieved. The next morning the patient's condition was unchanged, excepting that he was worn out with pain, which had been unremitting. He had not slept at all, had taken the morphin tablets hourly without relief, the only effect being that they produced drowsiness. Temperature, 98 degrees; pulse, 72. The patient fainted while attempting to walk across the room. The auditory canal was dry, the m. t. injected along the line of incision, but no secretion present. His pain was deep in the ear and over the mastoid. The mastoid was very tender but not reddened.

Pain lasted all day. Prescribed 15 grains trional to take at 10 p. m., and a saline purge. The auditory canal was plugged with cotton, and the ear and side of the head were confined under a large mass of cotton with a roller bandage.

Patient slept some after taking the trional; feels weak and complains continually of deep-seated pain in the ear and in the mastoid region. He has an ashen color and an anxious expression. Inspection shows a crop of ten vesicles over the tip of the mastoid and just below on the side of the neck, the lowest being the largest. The audinal auditory canal presents the slit-shaped appearance, and



Nc. Nervus cochleæ.
Rum. Ramus utriculo-ampullaris.
Nap. Nervus ampullaris posterior.
Ns. Nervus-sacculi.
U. Utriculus.
S. Sacculus.
Dc. Ductus cochlearis.
Css. Canalis semicircularis superior.
Csl. Canalis semicircularis lateralis.
Csp. Canalis semicircularis posterior.

(Page. 152.)

PLATE XII.

PLATE XIII.

Herpes zoster of the auricle (Vail). (Page 160.)

only a very narrow part of the tympanic membrane can be seen, and that appears grayish in color. The right ear appears normal, except that the membrana tympani is slightly thickened. The pinna on the left side is pushed very markedly forward from the side of the head, and the anterior surface of the mastoid appears edematous but not painful on pressure or percussion. A swelling about the size of the palm of the hand is situated over the region of the mastoid and reaches downward and backward, but not distinctly fluctuating; it has a very deep red color. Another swelling is situated more anteriorly, passing downward and into the depth of the tissues. It has similar characteristics on palpation and inspection, and has a fistulous opening in the region of the tip of the mastoid. When these swellings are compressed one can obtain a greenish pus containing small granules. During the patient's stay at the hospital another swelling appeared near the angle of the jaw on the left side, at first very hard, then softening down and soon becoming fluctuating, but it did not communicate with the fistula. By probing the fistula no loose necrotic bone or any rough surface of bone is to be detected.

An operation was decided upon, diagnosis having been made of a chronic suppurative middle ear disease, with mastoid involvement and secondary abscesses in this region, without rupture of the tympanic membrane; the possibility of an actinomycotic process was considered.

Operation.—The usual method of operating was pursued as far as the antrum mastoidei, cleaning out all the mastoid cells, which were filled with granulations. The characteristic greenish granules of actinomycosis were not found until the depth of the antrum mastoidei was reached. All the abscesses about the region were thoroughly opened up, curetted and drained. All of these cavities contained the greenish pus and granules. Inasmuch as the microscopic diagnosis of these greenish bodies had not been made, it was decided not to do a radical operation, leaving the ossicles and terminating the operation at this point.

The patient did not show the usual improvement that tory canal is dry and the bleb on the posterior wall is drying up. The incision in the membrana tympani has healed. The posterior wall of the auditory canal is sensi-

tive to touch, as is also the skin over the mastoid. Ordered salol gr. X, phenacetin gr. V, every three hours.

In about two weeks the eruption had entirely disappeared, having run a typical Herpes course.

Vail's conclusions are:

1. Herpes Zoster Auris is like true zoster elsewhere, a definite disease usually running an acute course.
2. Herpes Zoster Auris is very rare, but has been observed by a number of noted authorities.
3. It may involve the membrana tympani, as well as deeper parts of the auditory canal.
4. Herpes Zoster is most likely an acute infectious disease, causing neuritis, the storm center being in the ganglion of a sensory nerve.
5. Lymphadenitis is almost invariably present and probably precedes the attack.
6. Treatment is of little avail; the disease usually runs a rapid course and heals spontaneously.

Vicarious Hemorrhage. G. E. Shambaugh[1] reports a case of vicarious bleeding from the external auditory canal. The patient, an otherwise healthy woman of thirty, had for seven years noticed that for a few days prior to the time for her menstruation she would experience a full feeling in the head.

The bleeding from the ear did not occur every month, but often skipped one and sometimes two months. When the bleeding from the ear did occur she always noticed that the regular flow was correspondingly diminished and not infrequently the bleeding from the ear would take the place entirely of the menstrual flow. The amount of blood discharged from the ear varied from one-half dram to one-half ounce, and occurred at intervals lasting over several days.

Aside from the bleeding and occasional furuncles, the only thing she had noticed about the ear was the feeling as though the ear was being filled up.

On examining the ear the canal was found to be partially obstructed by a swelling of the upper wall just inside the meatus. This swelling was smooth, covered with the normal skin lining the canal, and was quite easily compressed, so that while it was found to fill two-thirds

(1) Laryngoscope, January, 1906.

of the opening of the canal, by a little pressure a speculum could be introduced. At the lower tip of the cone-shaped swelling was a pin-point area where the continuity of the normal skin was broken. No tenderness was experienced on pressure.

Vicarious bleeding from the external canal, though rare, is not an unknown occurrence. A few such cases appear in the literature. Usually the bleeding points are the opening of the glands found in the upper posterior wall of the canal.

MIDDLE EAR.

The importance of close observation of acute middle ear affections to prevent their extension to the labyrinth is emphasized by Ostmann.[1]

Such prophylaxis demands three things:

1. A knowledge of the channels by which infection reaches the labyrinth from the middle ear.
2. The conditions which favor such an extension.
3. The symptoms by which a beginning affection of the labyrinth can be detected.

There are four channels by which infection can reach the labyrinth: 1. Through the round window. 2. Through the oval window. 3. Through the capsule of the labyrinth where it forms a part of the wall of the middle ear. 4. From the mastoid cells through the horizontal semicircular canal. The access by the windows is most common in acute middle ear disease. That through the semicircular canal occurs only after a long and severe course with affection of the mastoid cells, while it is only after long continued suppuration that the middle wall of the tympanic cavity breaks down. The extension of the disease to the labyrinth is favored by the severity of the original infection and by lacking power of resistance on the part of the patient. If the middle ear disease pursues a mild course, invasion of the labyrinth is not likely, but if the disease is severe, leading to early suppuration and perforation, a labyrinthine affection is more likely to occur. A distinct reddening of the mucous membrane of the ear drum and swelling of the drum membrane and of

(1) Muenchen. med. Wochsch., April 10, 1906.

the auditory canal indicate an increased pressure within the tympanic cavity which is favorable to infection of the labyrinth through the round window. This pressure should be relieved by early incision of the tympanum, and means should be used to provide for a free escape of pus.

A suddenly occurring and marked reduction in the power of hearing for the higher tones by testing through air conduction with the Galton whistle, a transference of the perception of tones toward the sound ear and a diminution of the length of this perception by bone conduction while the inflammatory symptoms in the middle ear continue unabated or increase, indicates an invasion of the labyrinth by the most dangerous channel—the round window. On the other hand, with an invasion from the semicircular canal, ambiguous symptoms, like dizziness, vomiting, nystagmus and disturbance of equilibrium, will show themselves, to which acoustic symptoms are added as the labyrinth itself becomes affected. The first symptoms of affection of the labyrinth, even when recognized only as probable, should be the occasion for introducing vigorous measures designed to combat inflammation of the internal ear. Withdrawal of blood from the mastoid region, derivation by way of the bowel, proportioned to the strength of the patient, strict confinement to bed, with care to see that the flow of pus is unimpeded, are the principal measures to be employed. If the condition becomes more alarming, the mastoid process should be opened, even if there is no evidence of its participation in the pathologic process.

W. C. Braislin[1] reports two cases of *injury to the ear caused by lightning.* Both patients had just left the salt water and taken refuge in a building when it was struck by lightning.

Case I.—Isaac G., aged 27 years, was first seen at the Brooklyn Eye and Ear Hospital on August 1, 1905, when he applied for relief of ear symptoms. Two days before, he, his wife, and several other persons were shocked by lightning, five of them fatally. This man was unconscious for three hours, and had suffered from painful burns and shock. On regaining consciousness he noted a fullness in both ears, roaring tinnitus and impairment of hearing in

(1) Brooklyn Med. Jour., April, 1906.

both ears. The hair was burned from the left side of the occiput. A seared burn appeared on the back of the neck, thence across the left shoulder-blade and down the left arm to the elbow. The burned area on the shoulder was a superficial, irregular mark, the size of a spread hand, purplish red in color.

Ear Symptoms.—These were noticed by both patients immediately on regaining consciousness. In Case I the symptoms of tinnitus and impairment of hearing left the right ear within three or four hours, but became more marked in the left, and so continued until seen by the writer. In this case pain was also felt on the back of the auricle and at its attachment to the head. On the morning following the injury a blood-stained discharge from the left ear appeared and was present at the time the patient came to the hospital. Examination of the drum revealed a perfectly round perforation $\frac{1}{8}$ inch in diameter, slightly anterior to and below its center, its edges reddened and raw, as though a loss of its substance had occurred at this point. The remainder of the drum membrane was pale. The following day the membrane presented an appearance of uniform redness, except at the margin of the perforation, where it was somewhat everted, raw and swollen. Healing proceeded uninterruptedly.

Mrs. G., wife of Case I. Injured at the same time and manner as her husband, but less severely; was only momentarily unconscious. She immediately noticed that her hearing was defective; also a roaring tinnitus in both ears, worse in the left. She was examined on August 2. The drum membrane presented a small perforation, now sealed with a scab of fresh blood-red but dry extravasated serum. The perforation was in the center of the drum just behind the umbo. The right ear in both cases presented no visible lesion.

As an explanation of the ear injuries, it is supposed by the writer that both were due to the presence of water in the ears, as both had just left the surf. Water, being a well known, excellent conductor of the electric fluid, it is believed that a small charge of electricity followed a track of moisture in the external auditory canal, and thus in each case caused a perforation of the drum in finding its way to the Eustachian tube. Examination of these

cases with Hartman's set of tuning forks disclosed no lesion of the nerve or sound-perceiving apparatus, and both cases healed promptly under dry dressings, with only an inconsiderable impairment of hearing.

M. Kaeppelin[1] reports a case of hemorrhage from the common carotid occurring in the course of an ulcerative otitis in which the blood flowed profusely from ear, nose and mouth. A second attack being imminent, Kaeppelin intervened by ligature of the common carotid at the point of election. The hemorrhage ceased and no bad symptoms succeeded. Recovery was uninterrupted.

The author reports the case on account of the rarety of this serious complication and on account of the means of diagnosis on which he depended, viz: the abundance of the hemorrhage and the symptoms of paresis which were present. The result was unusually favorable, since the prognosis of similar cases has been somber indeed, only two out of four similar cases having recovered. The fatal result appears to be owing to an insufficient tension in the arterial system to force the blood through the unaccustomed channels of the collateral circulation.

J. C. Beck[2] reports a case of *actinomycosis of the middle ear* with the post-mortem findings as follows:

C. J., 54 years old, farmer, always healthy, never any ear, nose or throat trouble, had had for about six months swelling back of the ear and the side of the neck on the left side. This swelling was at first hard, soon softened, and was never painful. Later on, a third swelling appeared, also on the left side of the neck, which opened and discharged pus through a small fistula. When the first swelling appeared he noticed that his hearing became affected, but no subjective symptoms appeared.

Status.—A well developed man, showing no pathological changes in his heart, lungs, abdominal viscera, cerebrospinal and genitourinary organs.

The nose.—Hypertrophic rhinitis, septum deviated to the left.

Post-nasal space.—Examination is negative.

The mouth.—The majority of his teeth are absent,

(1) Lyon Medical, Jan. 21, 1906.
(2) Annals of Otol., Rhinol. and Laryngology, March, 1906.

and the alveoli are smooth. Some of the teeth are carious, but no periostitis or fistulæ can be found anywhere.

The tonsils.—Small, pale and with no ulceration. They are not painful on pressure, and no pus exudes on compression. The contents of two large lacunæ removed and examined microscopically show various kinds of cocci, and bacilli and stain by the Gram method, showing fragments of threads, which resemble the arrangement of actinomyces.

The Rinne test is positive on the right and negative on the left, and the Weber test lateralizes to the left.

The external canal of the left ear shows no secretion. The upper posterior wall is sagged down so that the exterfollows these simple operations; on the contrary, new areas of infiltration developed, these at first very hard, later softened, and discharging large amount of pus and a number of greenish bodies, which Zaufal examined personally and found to contain the characteristic actinomyces.

The patient now had considerable pain and one could see the marked progress of the affection; consequently another diagnosis was made, namely, actinomycoctic process of the temporal bone. It was now one month from the time of the first operation, and the second operation was performed, which was very radical in removing every vestige of diseased bone, thoroughly cleaning out all the pus cavities about the neck and thorough drainage established. Patient lived one week, and just previous to death a third surgical cleaning was necessary in order to relieve him of the tremendous pain that was present, due to the marked distention of the pus cavity. The patient's death was sudden, due to an intracranial hemorrhage, which proved to be a huge blood-vessel in the vicinity of this destructive process.

R. Leroux[1] reports two cases of *torticollis resulting from ear disease.* He believes torticollis is due to neuritis of the spinal accessory nerve.

After a suppurative otitis, the sternocleidomastoid and trapezius muscles showed signs of paralysis and atrophy. If examination fails to reveal signs of mastoid or glandular suppuration, thromophlebitis of the jugular vein may

(1) Presse Medicale, Vol. XIV, No. 62.

be suspected, as the spinal accessory nerve almost forms part of the wall of this vein, or the torticollis may be traced to meningitis. In the absence of signs of any of the above, examination of the blood may reveal latent suppuration or an extradural abscess. When the torticollis is the only symptom observed, it suggests that the nerve is involved only in its cervical portion, and only the external branch. Laryngeal disturbances are liable when both branches are involved. In some cases the patient becomes deaf after or during torticollis without ever exhibiting any symptoms pointing to the ear. In others there are no ear symptoms, but suddenly violent cerebral symptoms follow the torticollis. In every case of wryneck careful examination should be made of the ear.

G. Baar[1] reports *five cases of measles in one family,* each child having as a sequel acute suppurative otitis media.

In three of these children the mastoid process, the antrum, and the cranial cavity, respectively, had to be opened on account of alarming cerebral symptoms which appeared in spite of the previous most painstaking antiphlogistic and antiseptic treatment, poultices, and drainage after careful irrigations of the exterior auditory meatus with warm solution of borax or instillation with peroxid of hydrogen and drying.

The appearance of this purulent inflammation of the middle ear, at the end of the second week of illness, seems to speak very much against the universal view, according to which the measle otitides are caused by the primary exanthem. The fact that in the pus taken from the depth of the exterior auditory meatus as well as in the pus taken under aseptic precautions during the operation from the antrum, mastoid process, and extradural abscesses, was found the same coccus—a staphylococcus—shows the latter to be the cause of the disease.

K. Russ[2] reports a case of acute suppurative otitis media on the left side with a left-sided suppurative mastoiditis which terminated in a subperiosteal abscess from which Friedländer's bacillus could be obtained in pure culture. In addition, the patient's serum agglutinated cultures of

(1) Medical Record, Aug. 18, 1906.
(2) Wien. med. Wochsch., Aug. 25. 1906.

this bacillus when diluted in the proportion of 1 to 360. This agglutination could be demonstrated as long as 60 days after the probable beginning of the infection of the ear.

Wittmach[1] has reported cases of acute otitis media of a severe type occasioned by the streptococcus mucosa.

He believes that this organism is usually concerned in the production of the severer forms of the disease.

O. J. Stein[2] reports a case of *acute bilateral middle ear suppuration* following an intranasal operation and resulting in death from pyemia.

The patient was a woman 41 years old, thin and weak looking, but complaining of no particular ailment. Two days after the removal of the posterior end of the left inferior turbinate, she suffered from earache, the result of an acute inflammation in the right ear. The drum membrane was incised on the third day. The day following the left ear ached, and its drum membrane was incised twenty-four hours later. After the incision of the drum membranes all pain disappeared, and both ears soon discharged and continued to discharge quite profusely.

The patient when she entered the hospital on the 13th day had a pulse of 125 and a temperature of 103.6° F. Complaining of no pain or discomfort, not in the least irritable or restless, with a clear mind, but with a deafness so decided that one had to shout into her ears to be heard, let alone understood, and this with no history of marked deafness prior to the present illness. Slept fairly well and had a desire for food. She was nauseated and had vomited that morning after partaking of some solid food, and there was present a mild degree of diarrhea. No abdominal tenderness, iliac gurgling or petechial eruption. No cough, and chest examination was negative. Patient expectorated freely, but the secretion ran into the throat from the ears, and as a result there existed a membranous angina, not at all painful, involving the soft palate, uvula and arches. There was no history of temperature remission, chills or sweats, but a slight headache. The drum membranes were covered with a thick, necrotic membrane, but each had a large opening through which

(1) Deutsche med. Wochsch., Aug. 2, 1906.
(2) Laryngoscope, January, 1906.

the pus freely escaped. Exposed bone was detected with a probe in the middle ear of the left side. Percussion and deep pressure about either mastoid process elicited not the slightest pain.

An examination of the pus from the ears and from the secretions of the soft palate both showed a preponderance of the diplococci catarrhalis, and that of the throat a few bunches of staphylococci. The blood examination gave 4,000,000 red, 15,000 white, 85 per cent. polynuclear leucocytes, and 80 per cent. hemoglobin. The urine examination showed albumin, but no sugar.

Both mastoids were found to contain pus but no necrotic bone. On the 19th day of the disease the patient died, apparently from sepsis, though no autopsy was permitted.

Stein summarizes the important points in the case as follows:

1st. An acute suppurative process in both ears, following an intranasal operation.

2d. Absence of all pain or tenderness in or about the ears subsequent to the incision of the drum membrane on the third and fifth days, respectively.

3d. A profuse aural discharge, showing only diplococci, continuing for sixteen days.

4th. A most profound deafness.

5th. The maintenance of high temperature for sixteen days, with no decided changes excepting one complete intermission on the seventeenth day.

6th. Absence of rigors and perspiration.

7th. Pus in the urine.

8th. Diarrhea.

9th. Metastasis in the knee-joint and the side walls of the thorax.

10th. A complicating angina of the soft palate and arches, with a membrane showing diplococci catarrhalis infection, the same as found in the ears.

Treament of Acute Middle Ear Inflammation. G. Bacon[1] proposes the question, "To what extent is it advisable to adopt conservative methods in the treatment of aural diseases?" A summary of his answer is:

1. In all cases of acute otitis media attended with pain and temperature and bulging of the membrane, and par-

(1) Brit. Med. Jour., Nov. 17, 1906.

ticularly if the patient is suffering from a marked toxemia and mastoid tenderness, an early and free incision should be made in the drumhead. It is only in the very mild cases that it is ever wise to defer opening of the drum membrane.

2. We can often ward off a mastoid operation if the case is seen in the hyperemic stage by the application of the artificial leech and the Leiter coil, and by making a free incision in the drumhead. In the case of young children we can afford to wait longer than in adults, and it is often advisable in infants and young children to make several incisions in the membrane rather than to perform an immediate mastoid operation, especially if the principal symptom is elevation of the temperature alone. The nature of the infection should be determined by an examination of the pus from the middle ear. If the streptococcus, or pneumococcus, is present in large numbers, and particularly if the patient has marked toxemia with mastoid symptoms, an immediate operation in such cases is generally called for if the acute symptoms have not yielded to a free opening in the drumhead. A blood count should be made daily in order to determine whether the leucocytosis is increasing or decreasing, and what relative changes are taking place in the cell percentage. In other words, we should obtain all the evidence possible about the case before deciding to operate rather than rely on fever and pain alone.

3. In cases of chronic suppurative otitis media we should distinguish between those that require an early operation and those that can frequently be cured by conservative methods. In the former the drainage is apt to be poor owing to a small perforation and to the opening becoming clogged with cholesteatomatous material, the ossicles are carious, and there is caries and necrosis of the attic. The patient in such cases complains of severe headache and pain in the ear, and if good drainage is not established he is likely to have nausea, vomiting, dizziness and a possible intracranial complication. In the latter class of cases, if the drainage is good and the patient does not complain of any particular symptoms referable to the ear, the discharge can often be cured by the systematic use of the middle-ear syringe and the insufflation of powders.

4. In all operations on the mastoid we should be most careful not to expose the dura or the sinus, unless occasion requires it, for such practice has in some instances led to meningitis, and when the sinus has been accidentally opened septic thrombosis has followed.

5. In operations for sigmoid sinus thrombosis it is often unnecessary and dangerous to excise the internal jugular vein at the same time, especially in the case of children, for the longer the time the little patient is under the anesthetic the more grave becomes the prognosis. If the operation is performed early and the clot has not begun to disintegrate, it is generally unnecessary to ligate and excise the internal jugular vein, even if we do not secure a flow of blood from the bulbar end. In such cases it is wiser to postpone further operative interference for at least twenty-four hours.

Scheibe[1] gives the results of a definite plan of treatment in 272 cases of acute inflammation of the middle ear. The treatment consisted in inflation by the method of Pollitzer or Valsalva, sometimes with aid of the Eustachian catheter in cases where there was no evidence of suppuration; early incision in cases where suppuration was evident; antiseptic treatment of all discharging ears; opening of the mastoid cells when evidence of pus in them was obtained. The cases are divided into two classes, primary and secondary. Taking all cases together, the outcome was a cure with restoration of the hearing in 98 per cent.; less than 1 per cent. ended fatally on account of the ear affection. Five per cent. were complicated, and the mastoid operation had to be performed in half of these. Of primary cases all healed promptly; only 3 per cent. were complicated, and ½ per cent. required the mastoid operation. Of the secondary cases only 94 per cent. recovered, and 2 per cent. ended fatally. The course of the disease is more serious the more severe the primary disease. The duration of the affection is longer and the complications more frequent in adults than in children. In nurslings, however, the duration of otitis media is not only greater than in older children but longer than in adults. The presence of adenoid vegetations favored a longer course, more frequent perforation, longer duration of the

(1) Muenchen. med. Wochsch., May 22, 1906.

discharge, and a greater frequency of complications. The explanation is that they cause closure of the Eustachian tube, with a negative pressure in the middle ear, which causes an increase in the amount of pus. This illustrates the importance of inflation with air as a therapeutic measure.

J. F. Neumann[1] begins the treatment of middle ear inflammation, as soon as pain is felt in the ear, with moist, hot compresses, and continues these until suppuration and perforation occur. He wets cotton with boiling solution of subacetate of lead, fashions a tampon about 2 to 3 cm. long and of somewhat conical form, which is placed in the external auditory canal; another, somewhat larger and as moist and hot as can be borne, is placed in the concha. Over these are placed three pieces as large as the hand, which are applied as hot as can be borne, but wrung out, and over this is placed an impermeable layer and then cotton or flannel fixed with a bandage. If well applied these dressings retain their heat for as much as twelve hours. At first the application may increase the pain, and nervous individuals will sometimes undertake to tear off the dressings, but a soothing effect soon sets in and the pain ceases. This treatment is continued until recession of the inflammation or perforation is made artificially or occurs spontaneously. If it occurs spontaneously the bandage affords good drainage and guards against infection. When the acute stage is passed and suppuration persists, a dry dressing is to be preferred. The author recommends cleansing the ear with a solution of hydrogen peroxid followed by disinfection of the tympanic cavity by a solution of chloretone in liquid paraffin (1 to 10), which is allowed to remain a few minutes while the patient lies on the side opposite to the affected ear. The solution is then allowed to run out and a tampon soaked in an ointment of red precipitate (Hydrarg. oxidi rubri, 0.2; petrolati, 5) is placed in the ear.

Bier Method.—Dr. Hasslauer[2] has applied the Bier method of congestive hyperemia in 23 cases. Out of 14 cases of severe inflammation of the middle ear 5 recovered completely under the treatment. He would have felt

(1) St. Petersburg med. Wochsch., March 25, 1906.
(2) Muenchen. med. Wochschr., Aug. 21, 1906.

obliged to puncture the ear drum under the ordinary method of treatment.

In 29 cases paracentesis had to be performed, and 5 of these healed quickly. Hasslauer found that for the most part patients bore the method well. Some complained a little of headache. He noticed some redness of the vocal cords and also of the mucous membrane of the nose. The apparatus was applied 22 hours at a time. In some cases a deceptive appearance of improvements leads to abandonment of the treatment too soon. The treatment produced marked relief of pain. While the number of cases treated is too small to form a definite judgment, it seems probable that this method will be of great service in acute forms of middle ear disease.

Chronic Non-Suppurative Otitis Media. In deafness of Eustachian origin Gresswell[1] finds dilatation of the tube and middle ear with vaporized air more efficient than when non-medicated air is used. The vaporizer is used in the same way as the Politzer air bag.

When Eustachian deafness follows a chill or attack of influenza, it is well to make use of a solution containing thymolin, boric acid, pure carbonate of sodium, and glycerin. This may be acted on by the vaporizer and passed into the Eustachian tubes about four times at a sitting every other day. At first very little force must be used, and then gradually more may be added. If there be great dryness and irritability of the mucous membrane, a small amount of solution of nitrate of pilocarpin may be added to the solution; whilst if there be abundant catarrh, a little sulphate of atropin and suprarenalin may be substituted.

When there is such occlusion that no passage of air or vapor can at first be ensured, it is well to persevere with a fluid containing a larger amount of bicarbonate of sodium and a little eucain for several days, and also to act upon the lining membrane of the mouth and throat with the ordinary vaporizer. Such perseverance is often very useful even in chronic cases of Eustachian deafness. The particular medicament employed must vary with the case, but with care and skill astonishing success can be gained.

(1) Dublin Jour. of Med. Sciences, July 2, 1906.

In the use of massage of the drum membrane and ossicles, P. D. Kerrison[1] thinks not sufficient care is exercised in the selection of cases and in observing the excursions of the membrane. He accounts for the unsatisfactory results of pneumatic massage in two ways:

1. The movements of the membrana tympani are not those which Nature requires of it or which are necessary to the transmission of sound waves, and do not, therefore, exercise the drum membrane and ossicles in their normal function.

2. The undue strain to which the drum membrane is subjected tends to produce alterations in tension, reducing still further the patient's hearing power.

Pneumatic massage seems to be based on the theory that whatever will move the ossicles will improve the hearing. Its practice does not seem to be governed by any rules based on scientific investigations, the method of its application to different cases being largely a matter of guess work. Should this statement be objected to, it may easily be disproved by any one who will throw light on the following questions: By what established rules is the relation between the degree of deafness and the number of vibrations employed to be determined? Should the length of the piston stroke vary in different cases? If so, by what method other than guess work are such variations to be regulated in accordance with the varying degrees of deafness or ossicular fixation? Recognizing the obvious fact that any loss of tension in the drum membrane will necessitate the employment of greater force, *i. e.*, a longer piston stroke, in order to produce a given movement in the ossicular chain, how are such variations in tension to be determined and allowed for? Employing sufficient force to move the ossicles, how is undue relaxation of the drum membrane to be guarded against? These questions would seem idle except in so far as they may show weak points in a method of treatment from which much has been expected and which is still advocated by many distinguished aurists.

Blake has experimented with a set of tuning forks which he has had constructed, producing all the notes of the musical scale from 32 double vibrations (C^2) to 512

(1) Journal Amer. Med. Assoc., Dec. 1, 1906.

double vibrations (C^2), four octaves higher. They present a broad, flat surface which, when set in vigorous vibration and held close to the external auditory meatus, cannot fail to throw the drum membrane, even though thickened by disease, into more or less vigorous motion.

Routine of Experiments.—The hearing is first tested in much the usual way. The hearing distance for the acoumeter and for the conversation or whispered voice is ascertained. The lower tone limit is roughly estimated by means of the Hartmann set of tuning forks, and the upper tone limit by the Galton whistle. Increase or diminution of hearing by bone conduction is carefully noted. If the result of these tests points to a tympanic lesion, and the lower limit of the patient's hearing power is not above 256 double vibrations, a more exact estimate of the lower tone limit is made.

The results have varied greatly in different cases, some cases of fairly marked deafness responding favorably, while others of slight impairment have shown little or no improvement. Such contradictory results have occurred in cases apparently equally favorable for this experiment. They apparently depend on differences in the character of the lesion rather than its stage or duration. In those cases in which the experiment has resulted favorably, the improvement has been in the direction of improved audition for the lower musical tones and increased hearing distance for the watch or acoumeter. The improvement in certain cases has been marked, the hearing distance for the acoumeter being more than doubled and the range of tone perception being considerably extended.

The method is cumbersome, and its application necessitates an expenditure of time, rendering it unavailable as a routine measure by men in large practice. Nor have the results thus far demonstrated a sufficiently definite value in excess of what may be accomplished by other means to justify one in proclaiming this measure as a valuable addition to our therapeutic armamentarium.

Since *electrolytic dilatation of the Eustachian tube* was introduced in this country by Dr. Duel, of New York, it has had many advocates and a few opponents. Comparatively little is found in recent literature upon the

(1) N. Y. Med. Jour., Sept. 1, 1906.

subject, but this does not necessarily prove that the method is used less than formerly.

The experience of the Editor convinces him that it has a permanent place in otology. Undoubtedly the failures reported are due to two causes—improperly selected cases and faulty technique.

David G. Yates[1] reports a number of cases in which he has secured satisfactory results.

A considerable proportion of all cases of deafness of the non-suppurative variety are due either wholly or in part to stenosis or narrowing of the Eustachian tubes. This narrowing may be caused by a general thickening of the mucous membrane and submucous structures throughout the whole length of the tube, or a stricture may exist at one or more points only. A favorite site of obstruction is at the junction of the cartilaginous and bony portions of the Eustachian canal, *i. e.*, about half an inch from the tympanic end of the tube and one inch from the nasopharyngeal opening. In many cases the stenosis is found in the first half inch, and in others an organized deposit (the result, probably, of a former acute catarrhal otitis) is discovered blocking up the tympanic tubal orifice. These strictures increase in density with age, being easily penetrated or stretched in young persons, and often of almost cartilaginous hardness in middle or advanced age, where the lesion has lasted a long time.

As long as there has existed a science of otology worthy the name, this condition has been recognized and attempts made to overcome it. Gradual dilatation by forcing in currents of air under pressure, the injection of stimulating fluids and vapors designed to absorb the adventitious tissue, and finally the passage of bougies of various substances have all been employed with varying success. Of late years the principle of electroylsis has been used, following reports of this method in the dilatation of urethral strictures.

For the benefit of those who may not be familiar with the technique, a brief description of the procedure is added. The apparatus consists of a gold wire, olive-tipped, bougie attached by a cord to the negative pole of a galvanic battery of sufficient voltage to overcome the body resistance. Forty volts is strong enough. An ordinary hand

electrode is connected with the positive pole of the battery and grasped by the patient. The Eustachian catheter, insulated by winding with rubber tissue, is placed in position and the ear inflated in the ordinary manner to make sure that the catheter is properly situated. The iodin, menthol and camphor vapor is used in inflation and has a valuable influence in preventing infection. The bougie is now passed through the catheter and on through the tube as far as it will go without exercising force, and the current turned on until three to five milliamperes are indicated by the meter. No stronger current is necessary. The sensations of the patient must also guide the surgeon, for pain should be avoided. Having engaged the stricture, the bougie is allowed to lie snugly in contact for a few moments, when it will be found possible to advance the point a short distance. This maneuver is repeated until the stricture is passed and the surgeon is satisfied that the tube is open, when the bougie is slowly withdrawn and the current turned off. Often the patient will notice a fine crepitation while the bougie lies in contact with the obstruction, and this is taken to mean that the electrolytic process is going on satisfactorily.

Inflation should be performed before, but not immediately after, the bougie is used, for fear that air should be forced through a possible puncture of a mucous membrane into the loose surrounding tissues, and so set up a traumatic emphysema. Treatments with bougie should be about ten days apart, with one or two inflations between.

The main elements of success with the method are time and patience. The surgeon must be prepared to devote from one-half to three-quarters of an hour to a treatment of this sort, and this has undoubtedly been a factor in rendering the method unpopular with some busy otologists. Where, however, the requisite time is given and patience and care exercised in the technique, results are generally satisfactory and often brilliant.

Matté[1] reports a case of otosclerosis in which the noises were so troublesome that he ventured to open the labyrinth and scrape the walls of the vestibule. The operation consisted in loosening the external ear, cutting the drum membrane, removing the malleus and the incus

(1) Deutsche med. Wochsch., May 24, 1906.

through the external auditory canal and piercing the wall of the labyrinth making an opening about 3 mm. in diameter below the stirrup on the border of the fenestra rotunda. A Kessels curette was introduced and the vestibule scraped and the wound closed with strips of gauze. The flow of lymph was less than was to be expected. Bleeding from the labyrinth was very slight. The hearing seemed improved immediately after the operation, but gradually returned to its former condition; the noises which had been so troublesome ceased, although some boiling sounds were heard. The patient recovered from the operation and was in better condition than before. The author considers that the miserable condition of these patients justifies the undertaking of a serious operation. The technical difficulties are considerable. The opening should not be larger than 3 mm. in diameter, and care should be taken to avoid the facial nerve, the carotid and the jugular. The operation is more to be recommended if the other ear is sound.

Chronic Suppurative Otitis Media. T. Hubbard[1] believes that obstruction of the Eustachian tube is an important factor in post-operative mastoid fistulæ and in chronic suppurations of the middle ear.

In a number of cases having perforated drum membranes with tubal obstruction, all that was necessary was to relieve Eustachian congestion, cleanse the external canal, protect the tympanum from irritation, and normal drainage was reëstablished. In other words, it is the relation of the caliber and functional activity of the tube to the quantity and quality of fluid to be drained away which determines the direction of flow.

The majority of fistulæ at the site of mastoid operation are due to incomplete operation; either a pyogenic cell having been overlooked, or antrum not thoroughly cleaned out, or diseased attic being the source of pus. Such as these usually require a second operation. But there are cases in which a perfect operation is followed by a persistent mucous or muco-purulent discharge from a small fistulous tract in the depth of the excavation, and to this condition attention is directed. The first step is a careful examination of the Eustachian tube. An acute purulent

(1) Annals of Otol., Rhin. and Laryngology, December, 1905.

mastoid inflammation of a few weeks' duration, with constant flow of pus through the tube, causes hypertrophy of normal lymphoid tissue in and around the tube, and finally obstruction to drainage. Simple inflation by the Politzer method, or even the catheter, does not definitely determine the functional capacity of the tube. The use of the bougie is indicated for accurate diagnosis and treatment. The normal mucus secretion of tympanum and accessory cells left with intact secreting membrane will seek outlet by the channel of least resistance. The problem is to reëstablish the normal function of the tube; to encourage active drainage—something more than merely an overflow of the tympanic contents.

The habit of diverted drainage should not be allowed, if possible to prevent, for it is not improbable that even Eustachian secretions, following the path of least resistance, may be permanently directed toward the fistulous tract, if tubal obstruction near the pharyngeal orifice prevent for any considerable time natural flow into the nasopharynx.

Whatever be the cause of the purulent discharge, more or less extensive areas of pyogenic membrane in poorly drained cells, or eroded membrane, ultimate success of treatment may depend upon the condition of the natural drainage canal, the Eustachian tube. The proposition is simply stated. If the tube be permanently closed, impervious to forcible inflation and impenetrable by prolonged application of the bougie, then the only way by which the external discharge can be stopped is by destruction of all secreting membrane, normal or pyogenic, and cicatrization and epidermization of the tympanum attic and mastoid cells.

The author arrives at following conclusions:

1. Obstruction of the Eustachian tube is a common sequence of acute purulent otitis media and purulent mastoiditis and retards recovery.

2. It is a factor in causing chronic otorrhea, and postoperative mastoid fistulæ or delayed healing of mastoid.

3. Permanent occlusion gives one indication for the radical operation in chronic purulent otitis.

4. The condition of the tube should be determined prior to radical operation, and if permanently occluded in

the osseous portion there is no necessity for deep curettment of the tympanic orifice.

E. J. Moure[1] objects to the instillation of powders in the treatment of chronic purulent otitis media unless in the hands of an experienced operator who can see his patients every day; otherwise they may lead to the checking of the flow of secretion, which then is retained and infects the deeper parts of the ear. He prefers irrigation with a suitable irrigator with a douche point small enough so that it will enter the external auditory canal. This is preferably of glass but should have some ridge or other mark to show how far it can safely be introduced. This ridge can be made by passing a ring of rubber tubing over the nozzle. This nozzle is kept during the intervals of use in a large glass tube containing either a sublimate solution or 95 per cent. alcohol, by which it is rendered aseptic. With this apparatus about a half liter (a pint) of solution should be passed into the tympanic cavity, the nozzle being occasionally withdrawn to permit the escape of the fluid. The solution for irrigation may be boiled water containing 1/5 solution of hydrogen dioxid or a 5 per cent. boric acid solution or a solution of resorcinol in alcohol, made according to the following formula:

Resorcinol	10 Gm.	3ijss
Alcohol	500 Gm.	0j

A tablespoonful of this solution is added to half a liter (one pint) of hot boiled water.

If the tympanic cavity is granulating and the perforation a large one, the irrigation may be followed by the instillation of borated alcohol, diluted at first and gradually increased in strength until used undiluted; or carbolized glycerin may be used but rarely, as this often facilitates the formation and development of excessive granulation.

If the suppuration is recent and the perforation of slight moment, situated at the lower and anterior part of the membrane, and if the osseous lesions are superficial, the treatment by lavage as above indicated is usually sufficient to effect a cure. In the fungoid forms, on the other hand, with a large perforation and a slight and fetid

(1) Journal de Medicine de Bordeaux, Feb. 11, 1906.

flow, the irrigations should be discontinued, as they often serve to augment and prolong the suppuration.

Dry dressing may then be employed, under the express condition of having the patient constantly under observation. In these cases the first indication to be fulfilled is to suppress the granulations by a more or less energetic cauterization of the granular surface with chlorid of zinc 1:10 or chromic acid, curetting or even removing the ossicles if they are affected with osteitis or necrosis. This preliminary treatment having been carried out, the auditory canal and the middle ear are cleansed by irrigation, and all epidermic debris which may have accumulated there is removed. An air douche is then given either by the method of Valsalva or Politzer or, better, by means of the catheter. The affected region is then dried by cotton impregnated with borated alcohol or simple alcohol of 95 per cent. that has been gently heated over the flame to remove some of its causticity.

This being done, the suppurating surfaces are insufflated with a light layer of some antiseptic powder, as peroxid of zinc, boric acid, aristol, bismuth subgallate, etc. A small pledget of gauze, either impregnated with dermatol or iodoform or simply sterilized, is placed in the tympanic cavity, making a sort of packing which leads from the interior to the exterior. The dressing is left from twenty-four hours to three days, according to the abundance of the suppuration, and this method of treatment often leads to recovery when injections had been unsuccessful. In case the perforation is in the upper part of the membrane, ordinary lavage does not secure efficient cleansing, and it may be necessary to wash out the cavity through a canula. Lavage through the Eustachian tube is not to be recommended. Removal of the bones may sometimes be necessary.

The surgical treatment of the aural cavity does not differ in principle from that of other organs, and every lesion of this region ought to be treated as a common bone lesion, by rigorous asepsis and perfect cleansing, medical or surgical, of the part affected.

L. Emerson[1] thinks every practitioner should keep in mind the following facts regarding ear diseases:

(1) Brooklyn Med. Jour., June, 1906.

1. A chronic middle ear dry catarrh is incurable in the later stages.

2. The possessor of a chronic suppurative middle ear catarrh is the owner also of a cerebral powder magazine which needs but a spark to bring death and destruction with its touch.

3. There is no danger in checking this discharge in children or in adults; this is imaginary; to permit it to continue, then, is real danger both to life and hearing.

4. The prime causal factor in this condition is often removable, and its early recognition will save much grief and suffering.

The pathology of middle ear catarrah does not differ from inflammation of mucous membranes elsewhere. In the acute variety the hyperemia is followed by the exudation of more or less serous or purulent material. The lining epithelium is macerated and exfoliates. When this process is of a violent nature and there is tubal swelling or obstruction, the accumulation can find exit only through the membrana tympani or into the mastoid cells. In the first instance, perforation with otorrhea results, and in the second, mastoiditis with all its dangers of secondary brain abscess.

The symptoms of acute catarrhal otitis media are: impaired hearing, tinnitus, fullness in the ear, sharp lancinating pain, intermittent at times and usually more severe at night. The treatment is local venesection, and whatever the method—leeches, cups, etc.—let this be done just in front of the ear, and not behind it. Frequent long continued applications of heat by means of hot water in the ear, the whole covered by a poultice, hot gargles and nasal sprays, and inflations by the catheter or by Politzer's method give excellent results.

H. Gradle[1] calls attention to *odor* as a guide in the treatment of suppurative otitis.

In chronic suppuration of the middle ear, the success or failure of conservative treatment frequently cannot be predicted from the objective appearances at the first examination. Cases in which we can demonstrate caries or necrosis or cholesteatoma or involvement of the mastoid cells cannot, as a rule, be cured except by operation. But

(1) Jour. Amer. Med. Assoc., Nov. 24, 1906.

very often the existence of these lesions can only be suspected, not demonstrated.

Any sign, therefore, which enables us to test quickly the efficacy of conservative treatment should be recognized as a valuable guide. It has repeatedly been pointed out that important lessons can be learned from the odor of the discharge in the course of treatment.

With scarcely an exception, the discharge of chronic suppuration is characteristically fetid. It has been shown by bacteriologic research that this offensive decomposition of the pus is due to anerobic bacilli. Clinical observation further shows that this decomposition of the discharge is an important factor in prolonging the disease. The putrefactive germs are readily dislodged when the source of suppuration is freely accessible. If, however, there are any sinuses or fistulas or spots protected by granulations—in short, any spaces in which the pus cannot be reached—it is far more difficult or even impossible to remove the odor of the discharge.

The odor test is made in the following way: In every case in which there are no urgent symptoms necessitating prompt operation, the ear is washed out until the water brings out no further discharge or debris, and boric acid powder is then blown in lightly. In successful cases the odor disappears permanently after one or at the most two to three treatments of this kind. At the next examination the pus wiped out with cotton is odorless.

This class of cases requires no operation. The larger number are cured by the continuance of this treatment in from one to three weeks. The disease is evidently of a superficial character. A small proportion of these patients require a longer time for cure. Exceptionally a case is met with in which it seems almost impossible to remove a case of mucus discharge, although by some variations of the treatment (nitrate of silver or tannin in glycerin) success is usually obtained in the end. There is no reason to assume that in this class of cases an operation would prove of any benefit. The occasional relapses met with are clearly reinfections from the throat.

When irrigation followed by boric acid fails to remove the odor in the course of a few days, nothing can be gained by continuing the same treatment. Intratympanic

irrigation through a very slender curved canula will sometimes succeed, though not very often, in dislodging pent-up pus or retained epidermis scales, whereupon the odor disappears and the now accessible source of suppuration heals. Even less frequently than from intratympanic washing the same success is attained by installations of a mixture of alcohol and ether followed by a 10 per cent. carbolated glycerin. Whenever the odor can be removed by these measures, healing usually follows promptly.

In a certain number of instances the suppurating source is so inaccessible that these different therapeutic measures fail to remove the odor of decomposition. On the basis of long experience Gradle says positively that the continuance of different forms of treatment so far mentioned proves absolutely useless if they fail to remove the odor promptly. The only conservative treatment which, then, has been able to influence and cure a proportion of these patients is careful tamponing with gauze. If this is not properly done it fails even in suitable cases. After proper cleansing, a narrow strip of good absorbent gauze should be pushed into actual contact with the source of the pus as far as it is visible. The efficacy of the drainage thus created depends upon the dryness of the gauze and depends upon its frequent replacement. Drainage by gauze tampon does not remove the odor directly. Slowly the discharge lessens. It never takes less than three weeks, sometimes over six weeks, until the gauze remains dry. In some instances the odor persists until there is absolutely no secretion. In others the discharge may finally become odorless when it has been reduced to a minimum, when suppuration ends within a few days.

E. A. Crocker[1] reports six cases of *tuberculosis of the middle ear and mastoid,* and believes that cultures taken with special reference to the bacillus of tuberculosis as a routine measure in a large series of cases will show a large number of such infections, which clinically show no diagnostic symptoms. They constitute the majority of the severe mastoid cases seen in infants. It is, of course, decidedly more difficult to isolate the tubercle bacillus than the ordinary septic organisms commonly seen, and the absence of the bacillus cannot be regarded as proof posi-

(1) Jour. Amer. Med. Assoc., Oct. 20, 1906.

tive of the absence of the disease unless the pus or other septic material is injected into a guinea-pig and the results noted, but in the extreme cases there can be no doubt as to the diagnosis, without culture, from the unmistakable clinical signs.

First and most important of such symptoms has been the appearance of a small glandular swelling in front of the tragus either before or coincident with a middle-ear discharge. This gland is free from parotid involvement in its early stages, but later comes parotid and subzymgomatic induration with or without local abscess formation and in extreme cases after weeks or months the formation of postural abscess and infection of the glands in the neck. In the severe type the process is very apt to begin in the middle ear or temporal bone and to be attended by an early facial paralysis on the affected side and later by the formation of large sequestra either of the mastoid or petrous portion, or both. In this case the ossicles are apt to slip out easily and may be often found in the syringing fluid; and there may also be tuberculous processes in other bones of the body. The clinical picture thus presented, in the extreme cases, of the early parotid swelling and subzygomatic induration following or prior to the discharge of the ear in infants or young children and followed by facial paralysis, postaural abscess and general infection of the glands of the neck, with malnutrition and emaciation, is so typical that the diagnosis can be almost always made by a superficial observation. The prognosis in such a case without operation is absolutely bad, although a few undoubtedly recover after sequestra are formed and the process thus self-limits itself. Many die from exhaustion due to general septic infection, malnutrition or tuberculous involvement of other parts of the body, especially general miliary tuberculosis or tuberculous meningitis.

However, these bad results are rare under treatment even in extreme neglected cases. Much more commonly seen than these severe infections is an infection of the middle ear without involvment of other tissues or of the mastoid, evidently proceeding via the Eustachian tube, and generally, though not always, a complication of pulmonary tuberculosis. Here the process begins with the general appearance of an ordinary otitis media acuta with a red.

infiltrated membrane, but without very much pain or general systemic disturbance.

Local Anesthesia of the Ear. L. Katz[1] has investigated the action of alypin and novocain and has found that they are well fitted to act as ideal local anesthetics. Both remedies are readily soluble, easily sterilizable, without any diminution in their anesthetic power, and non-poisonous.

In contrast with the results of Impens he finds that alypin causes no marked dilatation of the vessels.

By conjoined application of alypin and adrenalin he found a contraction of the blood vessels, but not so great as by the use of novocain and suprarenin. Operations made with the former combination lasted longer on account of the increase of bleeding.

For drum membranes and tympanitic cavities Katz uses a 10 per cent. solution. He found alypin when used by itself produces an anesthesia which is deeper and of longer duration than that produced by novocain.

Katz finds novocain better to use with adrenalin preparations. While Brown has observed a certain tendency to the production of gangrene by alypin, Katz has not experienced any such results.

MASTOID DISEASE.

T. M. Hardie[2] gives a summary of the *indications for operation* in mastoid disease resulting from acute otitis media:

1. Pain: Consider its duration, situation and severity. Pain in the mastoid region is a very common symptom. It is frequently described by the patient as deep, boring, nauseating, usually worse at night. It is often just severe enough to cause sleeplessness. It may have come on with the acute inflammation in the ear, or it may not develop until some days after the ear has begun to discharge, or it may begin only when the previously profuse discharge from the ear has suddenly stopped.

Pain or pressure is a very important symptom of mastoid disease, but care must be taken both as to the method of eliciting tenderness and the situation chosen for its

(1) Deutsche med. Wochschr., Sept. 6, 1906.
(2) Laryngoscope, June, 1906.

early demonstration. It must be remembered that very gentle pressure over an acutely inflamed periosteum might cause excruciating pain, while deep pressure would be required to elicit pain when the inflammation was deeply seated in a bone the structure of which was dense and compact.

Pressure, therefore, with the end of the thumb or forefinger is to be slowly and steadily increased over the antrum, the mastoid tip and the region of the mastoid foramen. When endeavoring to elicit antrum tenderness the pressure is to be made just behind the auricular attachment and upwards and backwards from the external canal. Care must be taken if there is any question as to the co-existences of mastoid disease and furuncle of the external meatus that neither the ear nor the cartilaginous meatus is moved. When examining the tip be sure to compare the two sides, as the normal tip is often sensitive to pressure.

Tenderness on pressure over the emissary vein which comes out through the mastoid foramen is also important, even although its presence does not indicate thrombosis of the sinus.

Finally, it is to be remembered that exceptional cases of mastoid disease exist in the absence of pain on pressure, and that not merely furuncle but occasional otalgias of hysterical or other origin may attempt to confuse us. Of equal importance, therefore, from a diagnostic standpoint, is the information we obtain by an examination of the external canal and drumhead.

2. The drumhead is markedly bulged forward or outward, frequently even after perforation has taken place. The perforation is most often situated on the apex of this projection in the posterior superior quadrant of the drumhead.

Of even greater importance and, when it is present, a positive indication for performing the operation, is bulging or sagging of the skin of the posterior superior wall of the meatus near the drumhead. In this case again external otitis (furuncle) is to be excluded.

Symptoms 2 and 3 require upon the part of the examiner ability to use the head mirror and ear speculum. Seeing in this case is not merely believing but knowing, and the

writer has always believed that the greater service one can render his students in otology is to teach them the use of the mirror so that their inspection of the drumhead may be adequate. It is worthy of mention that this symptom may be absent or not marked in cases in which, while there is free drainage from the middle ear and antrum, an abscess exists at the mastoid tip.

4. Discharge: Very frequently the discharge of pus is profuse, and if this has lasted for a week or more the necessity for operation is probable. In many cases the discharge suddenly diminishes greatly, or stops altogether, while the process in the mastoid progresses. A bacteriological examination of the pus is advisable; since, when the infection is due to streptococcus or pneumococcus, operation should be performed earlier, and the infection is likely to be more severe. This is particularly true of cases occurring in children.

5. The old-time symptom of edematous swelling, or swelling and reddening of the skin of the mastoid very often indicates neglect. When this is marked the auricle stands away from the head and if this occurs after the disease has existed for some weeks extensive absorption of bone in the process, and frequently perforation of the cortex has taken place. If the swelling occurs early the abscess is superficial, or the edema and other inflammatory symptoms are due to the periostitis associated with furuncle of the canal.

6. Another local symptom is a marked increase in temperature of the affected as compared with the sound mastoid.

7. Percussion of the mastoid performed with index finger or small hammer is to be regarded of diagnostic value if it occurs in connection with other symptoms, especially if the dullness develops while the patient is under observation; but its value as a diagnostic aid is very limited because there is sometimes no difference in the percussion sound of the healthy and the diseased mastoid, and the sound may differ in the two normal mastoids of the same individual. Further, it cannot be used when there is swelling over the process.

8. Andrews' test to determine the density of the mastoid, and hence the presence or absence of disease, is open

to the same objections, since it depends upon the same physical laws. Andrews' test is made by placing a stethoscope with a small bell over the tip and placing the handle of a C^2 tuning fork over the antrum. It is found that when the mastoid cells are filled with pus or granulations, or when the density is increased from bone proliferation, the sound waves are transmitted to the ears of the examiner with greater intensity and for a longer time than occurs when the mastoid is normal. No traction should be made upon the soft tissues, since this will increase the sound.

9. Usually temperature, pulse and respiration are not materially affected excepting in children in whom the temperature may rise to 104° F., even in uncomplicated cases. While there is usually a slight elevation of temperature in adults, and frequently one going to 101° or 102° F., fever may be entirely lacking.

Decided prostration, indisposition to exertion, when present, are suggestive. Chills, vertigo, nausea, vomiting, sweating are unusual excepting in the presence of intracranial complications. These occur more frequently in chronic cases but must always be looked for, since operation must be performed promptly in the event of their onset.

Every case of acute mastoiditis complicating acute suppurative otitis media should, of course, have the benefit of preliminary antiphlogistic, or so-called abortive treatment, before operation upon the mastoid is undertaken. This will include the free incision of the drumhead in the upper posterior quadrant and including the sagging inner portion of the posterior wall. Cold, either by means of the Leiter coil (of aluminum) or thin rubber ice bag, should be applied for not longer than forty-eight hours. Too prolonged use of the ice is to be avoided, since by its use the symptoms are masked. For the same reason analgesics should be administered with caution.

T. Hubbard[1] reports four cases of *mastoiditis associated with diabetes and two cases associated with nephritis.* Some of the symptoms of kidney disease are so similar to mastoid abscess with brain involvement that great care in

(1) Laryngoscope, July, 1906.

differentiation is required. He gives the following as the principal symptoms:

Pain in the head is common to otogenous brain abscess, meningitis, sinus thrombosis, and it is characteristic of uræmia and diabetic toxemia. When of severe type, there can scarcely be any distinction made between the headache of intracranial suppuration and that of systemic toxæmia, except that at some stage in the otogenous type it centers around the ear involved. However, being a subjective symptom and the mental clearness being impaired, differential diagnosis is often impossible.

The digestive system exhibits symptoms which in a casual examination cannot be said to be indicative of intracranial disturbance or systemic toxæmia. Anorexia, nausea and vomiting are of like character in certain stages.

Temperature. Epidural and brain abscess may exhibit a temperature range which is in a general way merely suggestive of profound systemic poison. Subnormal to normal, or even a rather high elevation may be noted, due to secondary nephritis or other complication.

Pulse and respiration may show characteristic depression in cases having marked increase of intra-cranial tension and this is also observed in uremia and other toxæmias.

Disturbances of equilibrium are observed in toxæmia and in arterio-capillary sclerosis as well as in disease of the temporal bone with and without intra-cranial involvements.

Vision is impaired, and only by ophthalmoscopic examination can it be determined whether due to toxic retinitis, vascular disturbance or an otogenous brain lesion.

Paralytic phenomena are common, and usually careful study will determine whether due to focal lesion or of uræmic or diabetic origin. However, in diabetes, paralysis of certain groups, such as ocular muscles, is occasionally seen simulating a focal lesion.

Convulsions are common to brain abscess, uræmia and diabetic toxæmia. A focal lesion may or may not be suggested.

Mental symptoms are much alike in toxemias and otogenous brain abscess. Delirium, insomnia, mania,

drowsiness, slow cerebration, and coma are characteristic of a not necessarily late stage.

He quotes Eulenstein's observations regarding the relation between mastoiditis and diabetes:

1. Clinical symptoms in acute suppurative otitis media and mastoiditis in diabetics, as well as operative findings, show the same variations as in non-diabetics and, with very few exceptions, present nothing characteristic.

2. The basic cause of mastoiditis in diabetics is not diabetes, but as in non-diabetics, the anatomical makeup of the mastoid process which constitutes the local predisposition.

3. A diminished resistance of the tissues due to diabetes cannot be demonstrated, save in a few instances, and in the great majority of cases it may be excluded with certainty.

4. Unexceptionable statistics as to the frequency of mastoiditis in diabetics, in respect to that of uncomplicated otitis media, can only be compiled from large material in order to exclude chance findings; and, before all, it is necessary that reference be had to the individual local disposition and anatomical peculiarities.

G. Gradenigo[1] reports a case in which he *sutured the ends of a facial nerve* which had been accidentally severed during a mastoid operation.

The mastoid operation, performed by a colleague on the first of April, 1905, showed that the pneumatic structure of the apophysis and the bone-cells contained abundant pus and granulations, whilst finishing the operation and demolishing with a gouge the little bone-cells placed behind the posterior wall of the auditory canal, a movement of the gouge cut off entirely and almost transversely the facial nerve, about the middle of the vertical descending portion. It is worthy of notice that at the moment of the division the colleague, who was chloroforming and watching the face of the patient, did not notice any contraction of the facial muscles, and that the act of grasping the peripheral stump provoked no contractions, so that first one doubted that the cord cut was really the facial. Also the tonus of the muscles of the face during the chloroform narcosis did not permit the recognizing with certainty

(1) Laryngoscope, January, 1906.

any want of symmetry on the two sides of the face. Only the corner of the mouth on the left side appeared a little lower than on the right; moreover, during the narcosis the palpebral reflex was absent only on the left side. The trunk of the nerve was carefully isolated from the bone, for about one centimeter, and the division which happened about the middle of the space thus exposed. At the end of the operation, the operator proceeded immediately to reunite the two stumps of the divided nerve, running them through with a very fine needle and silk, at some millimeters from the free extremities, and bringing the two divided ends together. The sutured nerve was then wrapped in a little cushion of gauze, independent of the gauze which filled up the large wound. The successive dressings were carried out with great care, to avoid any sort of compression or stretching of the nerve, and to prevent any collection of pus. They were renewed twice a day. One could so recognize that the suture was well preserved, and the suppuration was scanty. On the 8th of April the stitch was spontaneously eliminated and very soon the nerve remained surrounded by granulation tissue.

When the patient awoke from the narcosis the complete facial paralysis on the left side was noticed; the upper eyelid drooped so as to cover half the palpebral opening. When at rest the face did not appear very wanting in symmetry.

At first the electric examination showed a disappearance of the faradic reaction of the nerve and the muscles, and the presence of the galvanic reaction of the muscles, but not of the nerve. Afterwards, every reaction disappeared. In the meantime, complete healing of the otitis and the mastoiditis took place. For a long time, but without result, galvanism and massage were used. On the 19th of July, when last examined, almost four months after the operation, no sign of the reappearance of the function of the left facial nerve could be observed. The patient is still under observation.

The result of the suture of the facial nerve, performed immediately after the division, has until now remained negative. It is important to remark that the cut nerve was lodged in a suppurating cavity. The possibility of mobility returning later on should not be excluded.

Haag[1] considers *cholesteatoma* formation in chronic suppuration of the ear as one of the most dangerous affections to which the ear is subject. It occurs under certain definite conditions. The perforation of the drum membrane must occur near the border of the upper portion near the attic or the entrance to the antrum. The perforation must be such as to lead to a retention of the discharge in the middle ear. The origin of these accumulations has been referred to a tumor developed from fetal remains, but these are rare and of no practical interest to the otologist. The majority of these formations owe their origin to chronic middle ear inflammation. They are believed to be due to the inclusion of epithelium from the drum membrane and a condition of their formation is the continued activity of this epithelium which can only be maintained where a bridge of epithelial tissue can be formed to the neighboring walls of the tympanitic cavity. This explains why such formations occur only when the perforations are at the margin of the membrane and is practically excluded if the opening occurs near the center.

Another condition of the formation is the occurrence of small ulcers on the wall of the tympanic accessory cavities and a third is irritation by the retained pus, so that a proliferation of the epithelium of the middle ear occurs with the production of successive layers of degenerated epithelium, crystals of fatty acids, cholesterin, etc., which characterize the tumors called cholesteatomata. Other explanations have been given as the closure of the eustachian tube by the "third" tonsil and also a retention cyst formed by implantation of epithelium among the granulations of middle ear inflammation by the operation of paracentesis.

Such tumors once formed develop like malignant tumors exercising pressure on the bony walls of the cavity causing the absorption of the mastoid cells with an appearance as if the bone had been chiseled out, opening the labyrinth and converting the whole region of the ear into a large cavity filled with the cholesteatomatous tumor. It may attack the sinuses or lead to eburnation of the bone with restriction of the cavity of the mastoid antrum. Its most

(1) Correspondenzblatt f. Schweizer Aerzte, Oct. 1, 1906.

favorable development is perforation of the tympanic cavity and the external auditory canal.

Cholesteatoma may almost always be recognized by the examination of the drum membrane. A peripheral perforation near the posterior and superior border of the drum membrane with free tympanic margin, behind which a fine hooked sound may be inserted, with an epidermoid metaplasia of the free white to grayish white median wall of the tympanic cavity and a more or less pronounced retraction of the drum membrane. If, in addition, products of the choleastoma formation such as lamellated shining white masses and crusts or silvery scales are removed from the auditory canal, and if these in the purulent stage have a cheesy odor, the diagnosis is established. A scanty secretion may be taken for cerumen. Sometimes the cholesteatoma is concealed by hypertrophy of the upper and posterior wall of the external auditory canal. The constitutional and subjective disturbances may be altogether lacking or may be limited to a dull ache behind the ear. Sometimes dizziness and headache and mental disturbances arouse the suspicion of complications in the bone.

Treatment is conservative or operative. The former consists in introducing antiseptic liquids or powders through the perforation into the cavity of the choleasteatoma. Treatment applied to the canal only is useless. These manipulations are the more successful the larger the opening into the auditory canal. If the perforation is too small the injections may be dangerous. They should be made every two or three days through a previously warmed tympanum tube under moderate pressure regulated by the sensations of the patient. A 4 per cent. boric acid solution at 40° to 41° C. (104-105.8° F.) should be used. The cavity should then be carefully dried by a cotton wrapped probe followed by a few drops of strong alcohol through the tympanum tube and after this a fine boric acid powder or a mixture of boric acid and salicylic acid insufflated through a somewhat larger tympanum tube. Perhydrol solution is also very effective.

The disease treated in this way heals kindly but it is apt to recur.

The operative treatment affords better results. The radical operation, by which the seat of disease is freely

exposed by removal of the upper and posterior corner of the wall of the external auditory canal, and a free communication between the tympanic cavity and the canal assured, is to be recommended.

This operation is to be regarded as a prophylactic measure to ward off the dangerous complication of retention of pus. The latter shows itself by pain in the mastoid process, dizziness, etc. The operation should be recommended to all cholesteatoma cases, as it offers the chance of recovery with retention of at least the present degree of hearing power. The hearing has been improved in most of the cases.

The author follows Siebermann's operation technic.

J. D. Richards[1] reports a case illustrating the effect of long continued pressure upon the interior of the mastoid by a fluid of low infectivity.

Previous History.—For a number of years the patient, a woman, aged twenty-five, had had at frequent intervals attacks of neuralgic pain in the right ear accompanied by deafness and a feeling of stuffiness, but with no discharge. The hearing in the ear had gradually been lost. A year and a half ago during one of these attacks she had, in addition to these symptoms, violent pain in the mastoid region, and following this she noticed a slight swelling behind the ear, which was moderately tender to touch. The pain of this attack abated, but the tenderness and swelling which slightly diminished continued for about five months, when, owing to an exacerbation of the symptoms, she sought the advice of her physician.

At this time there was no discharge from the meatus, but upon close questioning she recalled having removed from the canal several times during the preceding months a slight amount of whitish matter, the odor of which she had failed to note. Throughout the entire period of her illness she had neither chill, fever, nor sweat.

Present Examination.—Patient is a bright, well nourished woman who complains of violent pain radiating from the mastoid region throughout the right side of the head. Immediately above the superior attachment of the auricle to the scalp there is a soft, resilient swelling, the size of a hen's egg. The skin over this area is not red-

(1) N. Y. Med. Jour., Sept. 22, 1906.

dened and there is no œdema surrounding the tumor. No tenderness is elicited on moderate pressure, and the absence of doughy induration seen in subperiosteal abscess is striking. The tumor appears to be non-inflammatory in origin, and on palpation is elastic, feels much like a hydrocele, and gives the impression of a cyst. It is impossible to obtain a view of the fundus of the canal, owing to the closure of its cartilagineous portion by the sagging of its superior wall which meets the floor. No discharge is found in the meatus, and on wiping the depths of the canal the cotton applicator remains dry. The examination of the eyes is negative, respiration and pulse are normal. Cerebration is clear.

Operation.—On making the postauricular curvilinear incision there was evacuated a small quantity of pus, together with an ounce or more of pale, straw colored, ropy material resembling in appearance and consistence the white of an egg. As the wound refilled a marked pulsation, transmitted to the fluid from the brain beneath, was to be seen. On introducing the finger into the incision it entered directly into the mastoid cavity, and upon complete exposure the entire structure of the mastoid, including the cortex, was found absent. The bottom of this cavity was formed by the dura covering the anterolateral surface of the cerebellum, that of the sinus, and that of the inferolateral aspect of the temporosphenoidal lobe. Attached to the dura and separating it from the fluid contents in the mastoid cavity, was a thin, delicate, cyst like pellicle which detached with readiness from the meninges, leaving this latter structure of a finely granular, but healthy, red appearance. The posterior canal wall, with the exception of its extreme inner end, had disappeared. The effect of pressure absorption was beautifully illustrated at the posterior root of the zygoma. There the pneumatic structure had disappeared, and the posterior root was represented as a cup-shaped depression absolutely smooth; it appeared to have been excavated with a burr. The tegmen tympani was absent, the membrana tympani intact, the tympanum filled with large, pale, flabby granulations. The inner end of the anterior wall of the auditory canal was eroded, and the joint of the inferior maxilla exposed. The eustachian tube was of enormous size and

packed with granulations similar to those occupying the tympanum. From the collection of subperiosteal fluid immediately above the pinna a sinus led forward over the zygomatic arch into the temporal fossa; from this, material similar to that occupying the cavity of the mastoid was drained. The response of the dura, in the production of the cyst-like pellicle to long continued pressure by a fluid of low infectivity was interesting.

The further history of the case was that of an uneventful healing without rise of temperature.

C. J. Heath[1] reports ten cases in which he modified the radical mastoid operation with the special object of retaining or improving the hearing.

The procedure followed in the operation is in its opening stages similar to the early stages of the radical operation, but later there are modifications which will be described hereafter. The same cap can be used to obviate the need of shaving the head, and most of the same instruments are suitable. The antral probes, however, must not be used to locate the antrum through the tympanum, otherwise the hearing apparatus may be damaged. After the exposure and necessary treatment of the antrum and any communicating cells and cavities any granulations found in the aditus must be removed and the orifice shaped to fit the cannula, which is to be used to blow air through the antrum, attic and middle ear. If this passage be unusually long it may be shortened by removing bone at its posterior end and then it should be plugged to prevent the entrance of blood or bony fragments. Next, a tiny wet cotton swab should be placed on the perforation of the tympanic membrane to keep fragments from entering the cavity through that aperture. Most of the posterior part of the bony meatus must now be removed and, if necessary, even portions of the upper and lower walls, according to the size of the meatus, until complete freedom of access to the drum membrane is obtained. Any polypi or protruding granulation should be removed with a special polypus forceps and with these also by pressing the blades against the membrane above and below the perforation the nearest granulations can be made to protrude through the perfora-

(1) Lancet, Aug. 11, 1906.

tion, when they, too, should be caught in the forceps and removed. These are the granulations which, if allowed to remain, would be likely to become adherent to the edge of the perforation and must therefore be removed or the membrane might afterwards become drawn inwards by contraction of those granulations. In removing bone near the tympanic ring the risk of injury to the facial nerve must not be forgotten. The plugs on the membrane and in the aditus should now be removed, a cannula with a bag attached fitted in the aditus, and while the membrane is under close observation a blast of air should be sent through the attic and tympanum and the effect on the drum membrane observed. If the perforation appears to be too small to allow of egress of the contained tympanic secretion it can be enlarged; if in an unfavorable situation an entirely new opening can be made for the purpose of facilitating the exit of any material within the tympanum which is capable of expulsion by a powerful blast through the aditus. A syringe having been attached to the cannula, the whole tympanic passage should next be irrigated in the same direction with some bland antiseptic, and this fluid should finally be expelled by the air douche and the plugs replaced in the aditus and deep meatus. The cartilaginous meatal flap should be fashioned on the same plan as that advocated for the radical operation above referred to but should include rather more of the superior quadrant in order to allow throughout the entire after treatment of that uninterrupted view of the membrane which will insure the prevention of any untoward complication, such as an adhesion of the membrane to a granulation. The wound behind the ear must be completely closed with sutures and all after treatment carried on through the cartilaginous meatus, which should be enlarged sufficiently to permit the use of a drainage-tube about five-eighths of an inch in diameter, and as less bone is removed in this than in the radical operation this tube occupies a more oblique position. A wet dressing in this operation is the best and should be continued in diminishing sizes as long as an external dressing is needed.

After-treatment.—As the operation will have rendered the whole of the tympanic membrane visible the after-treatment has thereby been made interesting, not to say

instructive; it will also be found to be of shorter duration and less painful than after the radical operation, for there is generally but little of the slow-healing pars petrosa involved and the sensitive tympanic cavity will not be exposed. On the day following the operation the dressing and the tube are removed, the entire cavity is cleansed and dried, swabbed with cocaine solution, and after a short interval dried again. Then the patient is ordered to hold his nose and blow air through the ear by Valsalva's method, while the effect on the membrane and perforation is carefully watched. The discharge expelled in this way is removed with tiny mops and the odor and consistency are noted; the cannula is then passed into the aditus and observation again taken of the effect on the membrane and perforation of the passage of a blast of air from this direction. The material thus expelled, which may be more purulent than that blown out by the patient's effort, should be removed, its odor and appearance noted and recorded, and if matters are progressing favorably the disagreeable qualities will no longer be present.

The condition of the hearing power should next be tested and recorded and it will usually be found to have already improved. Finally, after seeing that the membrane is free from the liability of adhesion to any granulation, a precaution necessary for several days, the cavity may be swabbed with iodoform emulsion, the same tube replaced, and a dressing applied. After trying several methods the following conclusion has been arrived at, viz., that after the initial cleansing patients who have undergone this operation recover as quickly without as with fluid douches through the ear, and this should not be surprising when it is remembered that air is the natural occupant of the free parts of the tympanum. Certainly no applications should be used which are likely to retard the growth of ciliated epithelium. If the aditus becomes prematurely blocked with granulations the passage of a probe will insure the freedom necessary for the use of the cannula but the probe should not be allowed to pass as far as the attic for fear of injury to the attachments of the incus.

There is no difficulty in inserting the probe or cannula into the aditus without seeing it, if the drainage-tube be

shaped properly, kept in position, and the soft parts fixed during the operation with the object of providing this necessary access. Within a day or two of the operation the discharge will often be seen to be mainly or entirely from the bone and soft parts and the secretions of the tympanum to have diminished to such an extent that the eustachian tube is adequate for their exit.

The meaning of the sounds given out by the perforation when air is blown through the aditus is soon understood, and a day or two after the operation it is usually found that nothing but mucus comes through; the sound during inflation will then probably be moist at the beginning only, for the amount of mucus being necessarily small it gets blown out at the commencement of the inflation. When passing a probe or cannula into the aditus the mucus in the perforation, and even the drum membrane itself, can be seen to bulge outwards. The granulations which at the operation were visible through the perforation shrink and in a few days disappear. May it not be presumed that those in the attic which cannot be seen will do the same? After trying various methods of after-treatment this plan through the enlarged cartilaginous meatus has been adopted as the simplest and most direct in all cases of mastoid disease when the antrum is opened, and if the lateral sinus should be situated far forward this is the only practicable route, and anyone who sees for the first time the ease and accuracy with which the after-treatment can be carried out in this way will wonder how he ever managed satisfactorily through an opening behind the ear, for then, if the meatus should happen to be small, it is impossible either to treat or to see the tympanic condition. As might be expected, the part of the wound in which the healing is most delayed is the bony cavity in the mastoid process, the aditus usually being closed, the perforation healed, and thus the hearing apparatus made safe, some time before the antral cavity has filled and granulated, but though unhealed the discharge given off by the granulations when not irritated by the contact of mucus is so trifling that a piece of wool placed in the concha to cover the tube has been found to be a sufficient dressing.

In each of the ten cases reported there was marked improvement in the hearing.

In an attempt to avoid the unsightly scars which sometimes follow mastoid operations, W. Roberts[1] makes the primary incision exactly coincide with the post-auricular fold.

For convenience of description, he divides the incision into three parts:

1. An incision coinciding exactly with the posterior and superior attachment of the auricle.
2. An incision extending from the lower end of the first incision to or below the mastoid tip.
3. An incision backward joining and perpendicular to the first incision and on a level with the middle of the bony meatus.

In making the first incision the ear is allowed to remain in its normal position instead of being held forward by an assistant, because it is impossible to place the incision accurately with the loose skin on a stretch and normal relations lost. The first cut, made with a very sharp knife, takes in only skin and superficial fascia. If an attempt is made to carry the first incision to the bone, as is usually recommended, it will be found to be very difficult to keep the skin wound in exactly the right line, the superficial loose structures being pulled aside when firm pressure is exerted in making a curvilinear incision. The deeper structures are then rapidly divided, care being taken to go down to the temporal fascia only, above the temporal ridge, in order to avoid dividing the muscle and incurring unnecessary muscular hemorrhage when there is no particular advantage in so doing. This single curvilinear incision would be found to give ample room in most cases of tympanic exenteration for chronic suppuration and in many acute mastoid cases where the Schwartze or Schwartze-Stacke operation is done, but which only a small part of the outer table has to be sacrificed.

If after the mastoid is opened and the disease is seen to be more extensive than can be dealt with through this opening, then the operator should unhesitatingly extend the incision to or below the mastoid tip (incision No. 2) and backward toward the occipital protuberance as far as necessary (incision No. 3).

Another incision may be added extending directly up-

(1) Amer. Med., October, 1906.

ward, on a line with the center of the bony meatus, from the upper extremity of the primary curvilinear incision, if for any reason it is desirable to expose the middle cranial fossa.

The subject of *local anesthesia in aural surgery* is discussed by H. Neumann,[1] who opposes the conclusion of Braun[2] that the field of local anesthesia is extremely limited in operations on the ear on account of the anatomic configuration of the parts which prevents a deep extension of the anesthetic influence. Braun's claim that the conductivity of the glossopharyngeal nerve cannot be abolished is contradicted by the fact that in the Vienna ear clinic such operations as the complete chiseling out of the middle ear cavity with removal of the hammer and the anvil have in the vast majority of cases been carried out without pain. The sensitive nerves supplying this region are chiefly the vagus, glossopharyngeus, and the sympathetic. By the correct application of the author's method it is possible to obtain a complete abolition of sensibility in the field of operation. This depends largely on the action of suprarenal alkaloid in bringing about a widespread anemia of the region and acting in a selective manner on the nerves. The method is as follows:

The needle of the injection syringe is introduced into the upper wall of the cartilaginous portion of the external auditory canal about ½ to 1 cm. (1/5 to 2/5 in.) from the bony part and pushed under the periosteum. The place of injection can easily be found by the fact that by raising and lowering the movable portion of the ear the membrano cartilaginous portion is sharply distinguished from the bony part by a sort of fold which marks the limit of the bony and cartilaginous portions. Another point of distinction is the dull appearance of the cartilaginous portion as compared with the shining surface of the bony part. When the point of injection is determined the needle is introduced in an oblique direction from below upward and pushed to the upper wall of the bony portion and under moderate pressure the liquid warmed to 45° C. (113° F.) is injected. The fluid injected spreads directly under the mucous membrane of the tympanic cavity and is also dis-

(1) Deutsche med. Wochsch., April 12, 1906.
(2) Ibid., No. 1, 1906.

tributed by the vessels. The injection itself is almost painless. With very sensitive patients the slight inconvenience can be obviated by the application of a spray of ethyl chlorid.

In mastoid operations the injection is made perpendicularly to the surface of the mastoid process until the needle reaches the bone, when the point is inclined and driven obliquely forward and 3 to 4 c.c. of the liquid warmed to 50° C. (122° F.) injected under a low pressure. The method is superior to the infiltration method of Schleich, in that the operation can be begun as soon as the injection is finished. The operation of chiselling is at first unpleasant on account of the concussion it occasions, so that it is advisable to remove at first only small pieces of bone. It is also to be recommended that the jaws be fastened together.

In cases of complete chiselling out of the tympanic cavity the method for the mastoid is combined with that already described for the tympanic cavity. No untoward effects have been noticed after local anesthesia and the operation can be carried to completion without interruption. The author has tried various substitutes for his injection fluid which consists of cocain and a suprarenal preparation, but has no occasion to change his method.

H. O. Reik[1] advocates the *blood clot method of dressing* after mastoid operations as described by C. J. Blake. The plan is to allow the operation cavity to fill with blood and to close the post-auricular incision at once.

The primary object of this dressing is to obtain healing of the wound by first intention, but, when this occurs, other advantages accrue; for instance, the normal contour of the mastoid process is restored, the resulting scar is a mere line which is entirely hidden from view by the auricle, and the period of healing is reduced to five or seven days, with practically no after-treatment. No deformity, almost no scar, and primary union constitute, on the whole, a stake worth playing for. On the other hand, in cases in which the blood clot fails to organize, there is no additional risk to the patient; should the wound not have been so clean as was supposed or should the clot become infected in any one of various possible ways, it

(1) Journal Amer. Med. Assoc., March 31, 1906.

simply breaks down and the wound has to be opened, cleansed and packed in the usual way, the patient then being in practically the same position he would have occupied had the open method been employed primarily.

With the modern teachings of surgery constantly before us, that all pus cavities should be treated as open wounds and compelled to fill up by granulation from the bottom, it is not surprising that this suggestion of Dr. Blake should have been received with skepticism, first, because of a fear of the possible consequences of inclosing in the wound some microscopic particles of infective material, and, second, because they considered the normal blood clot a favorable medium for the growth of bacteria. So far the answer to these expressed or implied criticisms has been solely in the nature of relating clinical experiences. A certain percentage of excellent results have been shown by those who have used the blood clot dressing, and as yet no one has related any unpleasant experience.

Experimental and clinical studies have shown that if any clean wound be filled with the patient's own blood and safeguarded from later infection, the blood clot tends to organize, and new tissue, similar to that inclosing the clot, soon forms to replace the latter. The blood flowing into the wound cavity rapidly clots, and the fibrinous framework of this clot constitutes a scaffolding on which the new tissue is built. Fresh granulations spring from the walls of the cavity and grow out into the clot, forming a new fibrous connective tissue, the nature of which is further altered to accord with the character of the surrounding cavity walls; that is, if the wound be made in bone, osteoblasts are sent out from the bony walls or from the periosteum to convert the fibrous substance into osseous tissue. The migratory power of these osteoblasts is limited, and they travel only a short way from their starting point, so that, in the case of a large cavity in bone, the newly formed bone does not extend far from the cavity wall, and the center of the new formed tissue fibrous in character. It seems quite probable, however, that in a small cavity, such as we ordinarily make in the mastoid process, the osteoblasts, reaching out from all directions, may extend a sufficient distance to meet in the center and thus to complete the construction of a new bony process.

Just how early this osteoblastic activity commences is not known, but such cells have been observed to form within forty-eight hours after the operation, and it is certain that granulation tissue grows more rapidly into a healthy blood clot than into space. It is plain, then, that Nature may be greatly aided in the reconstruction of destroyed tissue by providing an excellent framework on which to build and leaving her only the task of furnishing vascularity and new tissue cells.

But suppose the wound cavity to be treated is not absolutely clean; that some invisible particle of septic material is present when the blood is introduced, has the blood any bactericidal or antitoxic powers? A long series of observations by the most careful investigators has clearly proved that the normal human blood does possess such properties. Metchnikoff, Nuttall, Fodor, Lubarsch, Vaughan and Novy and a host of others have published most interesting work on this subject. From their several experiences we may safely draw the following conclusions: The normal human blood possesses bactericidal power, varying in degree in its antagonism to different micro-organisms; this property of the blood is greater after it is drawn from the vessels than while circulating intravascularly; the microbe-destroying substance is found in the serum, but is produced by the leucocytes; certain chemical changes in the blood may be induced either to increase or to diminish its bactericidal power, and this property of the blood naturally diminishes after the clot is forty-eight hours old.

The use of carbolic acid and alcohol for the cleansing of the wound, as an extra precaution of cleanliness, prior to the introduction of the blood, has been recommended by some surgeons, but it seems not unreasonable to venture the suggestion that some of the failures with the blood-clot dressing may have been due to excessive zeal in the use of carbolic acid and alcohol for antiseptic purposes. If exact neutralization were possible and the wound left in a neutral state, no harm could result from the employment of these substances, but if there be left any measurable quantity of either it militates against success. On theoretical grounds it would appear more rational to rely on dry cleansing of the wound with instruments and sterile sponges, or to wash the cavity with sterile salt solution,

which, if it produces any effect on the coming clot, renders it more alkaline and increases its power to control septic material.

T. B. Sprague[1] advocates the plan of allowing the mastoid cavity to fill with a blood clot in certain cases after operation for acute mastoiditis.

The first step in the operation, after thorough disinfection, is to carefully cleanse the external auditory canal and tympanum. The tympanic membrane should be freely incised from top to bottom, at the same time cutting deep enough to penetrate the engorged edematous mucous membrane of the cavity. Then this should be thoroughly irrigated and swabbed with 60 per cent. alcohol, after which the canal is plugged loosely with gauze. The post-aural field is then scrubbed with soap and water, ether, and finally alcohol, and the scalp within the radius of four or five inches is wet with alcohol, after which the sterilized protectives are applied and we proceed to open the mastoid.

In making the incision, in applying the artery clamps, or in using retractors and other instruments, all unnecessary bruising of the soft parts should be avoided. The cut in the periosteum should be continuous and clean; it should be elevated without injury, and carefully replaced after the bone is evacuated. After the diseased tissue has been removed and the bone cavity made smooth and clean, a small curette is used to reach into the aditus and deep part of the antrum and remove the pyogenic membrane and any necrotic tissue. The cavity is now thoroughly irrigated with sterile normal salt solution and then mopped dry and allowed to fill with blood. If the soft parts have necrotic areas and pus cavities, they should be removed before the bone is opened. The cavity now filled with blood, the periosteum is replaced and the soft parts brought together and sutured; subcutaneous wire sutures or silk-worm gut are preferable. Interrupted sutures may be used; buried ones are best. Care should be used, however, not to tie them too lightly, for if swelling occurs, parts of the wound may become strangulated, slough, and suppurate. After the wound is closed, the plug of gauze is removed from the canal, which is again carefully cleaned

(1) Laryngoscope, September, 1906.

by wiping and a new wick inserted; the wound is again washed off with saline and dressings applied. The dressings are removed on the third day and the canal wick removed, which will probably be saturated with serum: the canal is wiped dry and a fresh wick loosely inserted. The dressing is then reapplied and left another day or two, according to circumstances. When this is removed the canal wick is dry, or nearly so, at this dressing, if everything is doing well. The wound is examined, and if it looks all right is not touched. If there should be any local redness and swelling, a vent should be made with a probe at this point; and if secretion is present it should be wiped out, not irrigated. If it is serum, the vent can be allowed to close again. If it should be pus, a gauze wick would be inserted and the wound treated as a drained wound. If at the operation we decide that it is not wise to use the closed method, the only difference in technique would be to place the gauze wick or Halsted protective drain in place after the wound has been closed, between stitch loops, as previously described. If the drain method is employed a cotton-tipped carrier is passed into the opening and the serum soaked out by the cotton. This is repeated till the cotton comes out dry; and the discharge of serum ceases in from seven to ten days, after which the wound is allowed to close. If pus appears in the wound it is irrigated by normal salt solution. This cleanses the wound as well as any so-called antiseptic solution, and does not interfere with healing by producing superficial necrosis of the new forming tissue, as bichlorid as weak as 1/10,000 has been known to do. The stronger antiseptics do more harm than good, retarding repair rather than helping it.

If drains are used they must be left out at intervals and discarded as soon as possible, as in some wounds the discharge is increased by them. If their use is continued too long they interfere with healing.

The indications for the use of the blood clot in the mastoid can perhaps be better considered by excluding what prove to be contraindications, those conditions under which the method has almost invariably failed.

Naturally blood-clot healing is not to be thought of in

acute infectious diseases or in tuberculosis, diabetes or chronic constitutional ailments.

The infecting organism plays an important part in the healing process. In primary acute cases, if the staphylococcus is present it has always broken down and suppurated. If streptococcus is present in pure culture, and operation is demanded before the opsonic index of the blood is sufficiently high to resist the infection, or Nature has not had time to throw up her fortifications around the local process, the blood clot should not be attempted, as not only the clot becomes infected, but the virulence of the organism is so great that the whole wound suffers more or less. The stitch holes and along the line of incision and every freshly opened area is in 48 hours covered with a fibrinous exudate. If we have no bacteriologic examination to help us out, the duration of the disease from the primary otitis will be a safe guide and, all things considered, is probably the most reliable even when the laboratory aid is available. It seems to require, on the average, about ten days from the onset of the middle ear trouble for Nature to do her work of fortification.

The virulence of the infection is another important consideration. This is indicated by high fever and the severity of the constitutional disturbance. Cases with extensive necrosis of the bone, when the process extends into the zygoma and petrous cells, and with extensive necrosis of the soft parts, with widespread accumulation of pus, should be treated by the granulation method.

A. Barkan[1] advocates the use of the *burr in mastoid operations.* He uses three sizes of burrs driven by an electric motor. In the absence of electric apparatus the dental engine answers every requirement.

Heating of the burr is prevented by the assistant dropping sterilized normal salt solution upon it.

The advantages claimed are:

1. That it is a safer instrument than the chisel.
2. That the absence of concussion is of decided advantage.
3. It leaves a smoother bone cavity, thereby facilitating the healing process.

(1) Annals of Otol., Rhin. and Laryngology, March, 1906.

Purpura Following Mastoid Operation. W. C. Braislin[1] reports a case in which he operated for acute mastoiditis and at the same time removed a mass of adenoid tissue from the nasopharynx.

On the evening of the third day following the operation the boy complained of itching on legs and feet, was restless and feverish. On examination the feet were found swollen and dark with extravasated confluent blood blotches; purpuric spots on legs below the knees and on the feet. The next day the swelling in the feet had subsided, but dark, subcutaneous extravasations existed below the malleoli and at the tarsal joint. Non-elevated purpuric spots still visible on legs. These rapidly faded to a pale yellow color, but four days later a new crop of purple hemorrhagic spots appeared. Bichlorid gauze was substituted for the iodoform; urine examination negative. Acidulated fruits were prescribed.

Four days later, on May 6, the boy felt chilly and miserable; pains in the ankles, knees and elbow joints, and later in the evening large purpuric spots appeared on the thigh, largest on the posterior aspect, some as large as a silver quarter-dollar; also on the legs and ankles, though less numerously about the ankles than in the previous attacks. On the full appearance of the purpura the boy felt better, and was bright when seen next day. A subsequent attack three or four days later appeared similar to though lighter than the preceding. There were no further attacks and the wound healed in seven weeks.

Summary.—Alarming symptoms and the appearance of purpura followed three days after a mastoid operation, at which time, likewise, an adenoid operation was performed. Other attacks of purpura followed on subsequent dates. The patient lost a considerable amount of blood at this double operation at the time when an acute inflammatory process was proceeding in the middle ear. The removal of a large mass of adenoids left an exposed area of considerable size, capable of absorbing septic materials. The considerable loss of blood and the absorption of septic material from the pharyngeal wound favored, if they were not directly responsible for, the purpuria attacks.

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(1) Brooklyn Med. Jour., October, 1906.

Braislin has frequently advised against operating for adenoids during the presence of acute or subacute inflammation of the pharynx and tonsils, and believes that the source of anxiety in the above related case would have been avoided by postponing until later the removal of the pharyngeal hypertrophic tissue.

BRAIN AND SINUS DISEASE.

Sinus Thrombosis. In considering the subject of sinus of sinus thrombosis, H. E. Jones[1] classifies the evidence bearing upon the subject as follows:

1. Anatomical and physiological facts are obviously of first class importance. The whole plan of treatment is suggested as well as made necessary by the anatomical facts. Moreover, with the natural limits of variation the facts are constant and to be depended upon.

2. Clinical evidence is not so satisfactory; it is not always easy to say at what precise moment or spot particular pathological changes occur; similar changes in widely separated parts may produce similar general symptoms and give little or no local signs—for example, clotting in the various sinuses or veins, disintegration of the clot at various points, or mural extensions of the disease in different directions.

3. This difficulty is overcome by operation in proportion to the completeness of the operation performed. Intervention limited to the lateral sinus leaves much room for speculation; the complete operation clears up many doubts.

4. Post-mortem evidence is to some extent vitiated by changes which have occurred before operation, but will generally show whether the fatal extension took place backwards along the lateral sinus, downwards along the jugular vein, or along the collateral veins, or whether death was due to some coincident intracranial suppuration.

5. Mere comparative statistics based on the results of operations with and without ligation are of little value, because the cases which are admitted by all to require ligation are those in which the disease was either of a

(1) Brit. Med. Jour., Nov. 17, 1906.

much severe type or had been longer in existence before operation.

W. R. Dabney[1] has attempted to determine *the route of infection in thrombosis of the cranial sinuses.* Because of the healthy condition of the inner table, as shown by microscopic examination of bone chips, he concludes that infection reaches the lateral sinus through venous channels rather than by contiguity of tissue.

By the rich anastomosis between the vessels of the pericranium, the cranial bones and the dura mater, in fact, many of the veins of the scalp, the mastoid and the tympanic portions of the temporal bones pour their blood directly into the dural sinuses. If these veins once become the seat of septic thrombi, it is easy to see how the sinuses of the dura mater may be thrombosed when the inner table has not been in the inflammatory process. It is also possible to have a primary thrombosis of the jugular bulb when the purulent inflammation is confined to the tympanic cavity, and it is only due to the resisting forces of Nature that we do not see this complication oftener, when we consider the procrastinating tactics that are often adopted in the treatment of a purulent otitis media.

The small vessels of the mastoid become thrombosed and the plugs that are in the mouths of these vessels protrude into the sigmoid or other sinuses that are in proximity to the temporal bone, and thus we will have the starting point for the formation of a thrombus in these sinuses.

The prognosis in an acute osteomyelitis of the temporal bone is very grave unless it is recognized early and prompt surgical measures adopted, as the patient may die within twenty-four to seventy-two hours from the onset of the symptoms, the system being overwhelmed by the rapidly generated toxins.

H. B. Ellis[2] reports a case of sinus thrombosis, and gives the symptomatology of the condition as follows:

1. The characteristic symptom which is most likely first to be noted, and possibly the only one, is a sudden rise of the temperature, followed by spontaneous and as sudden a drop in the same to the normal or nearly normal condition. Therefore the temperature should be taken

(1) Laryngoscope, June, 1906.
(2) Laryngoscope, September, 1906.

frequently in acute suppuration of the middle ear whether or not there be mastoid involvement. If there be a meningitis or brain abscess besides the sinus thrombosis, this symptom is somewhat disguised, as the temperature seldom drops lower than 101 degrees to 100 degrees. An uncomplicated sinus thrombosis temperature wave frequently shows variations of from 6 degrees to 8 degrees, and is probably due to the periodic passage into the circulation of broken-down portions of the septic clot within the sinus, causing a general infection. If this condition continues for some time a general sepsis develops, with emaciation and an ashy-hued skin.

2. A severe chill is a frequent symptom, but is often entirely absent. Its existence makes the diagnosis the more easy, but its absence in no way excludes sinus thrombosis.

3. Profuse sweating nearly always follows the sudden rise of temperature, but even this may be absent.

4. Headache, mental dullness, paralysis or convulsions when occurring with the other symptoms of sinus thrombosis lead one to suspect and look for a meningitis or brain abscess.

5. A sinus thrombosis which has existed for some time is likely to extend downwards into the internal jugular vein. When this does occur there is likely to be some tenderness along the sterno-cleido-mastoid muscle.

6. Swelling of the lymphatics behind the ramus of the jaw sometimes takes place in sinus thrombosis, but is of but little diagnostic value, as it may arise from middle or external ear trouble without any involvement of the sinus.

7. The fundus of the eye should always be examined and if choked disc of opposite eye be found we are likely to find the sinus, the brain or the meninges involved.

8. An unusual and unaccountable depression and weakness is very likely to be found in patients suffering from thrombosis and its presence may be considered contributory evidence.

A. Bronner[1] reports an unusual case of thrombosis of the lateral sinus of aural origin. A strong, healthy lad of 14 years applied for treatment August 14. He had

(1). Lancet, Oct. 27, 1906.

suffered from chronic suppurative otitis media with occasional attacks of pain for several years. He had had severe pain in the mastoid region off and on for some days. There was no swelling or tenderness over the mastoid or over the jugular vein, but a large perforation of the drum with scanty offensive discharge. The temperature was 104 degrees F. and the pulse was 94. The discs were normal. He was put to bed and glycerin-of-carbolic-acid eardrops were applied. On the next day the pain had disappeared, and the temperature was normal. He felt perfectly well, with no pain or fever until September 2, when there was a sudden rise of temperature to 104 degrees and a severe rigor. The mastoid was opened at once and the lateral sinus was exposed. Some pus was found in the mastoid cells, but the sinus was apparently quite normal. The duramater looked quite normal, there was no extra dural abscess, and the sinus was not thrombosed. An incision was made into the sinus and there was a sudden gush of blood, which was difficult to control. There was no swelling or tenderness over the jugular vein. There were no papillitis, although the discs were rather congested. Both lungs became involved and there were signs of commencing endocarditis. The cerebellum was explored with negative results. The boy died on September 19. The post-mortem examination showed a small purulent clot in the jugular bulb. The lateral sinus was not thrombosed and the walls were nearly normal, with perhaps some thickening in the lower part.

This case is interesting from several points of view. There never was any swelling or tenderness over the mastoid or over the jugular vein. The walls of the lateral sinus were practically normal and the thrombosis was situated low down in the bulb of the jugular. We should in all similar cases not only examine the upper part of the lateral sinus but also the lower part as far down as the bulb of the jugular. The sinus may be apparently normal and the thrombosis be situated lower down. In fact, we should always, in cases of mastoid disease with recurrent rigors, ligature the jugular, even if we cannot find any definite lesions in the vein. The walls may be diseased over a very small area and a small septic clot form there which would give rise to septic disease of the lungs. Had the jugular

been tied early in this case the boy's life would have probably been saved.

In operating for thrombosis of the lateral sinus E. B. Deuch[1] exposes the sinus from a point just above the bulb to a point well beyond the knee, exposing at least an inch, and, better, an inch and a half of the lateral sinus. Pressure on the sinus at its lower portion is then made and the sinus opened. If a clot is found this is removed by means of the curette, the incision in the sinus wall being gradually extended backward until free hemorrhage occurs from the torcular end of the sinus. If necessary the bony covering of the sinus is removed as far back as the torcular. As soon as free hemorrhage occurs it is checked by means of pledget or iodoform gauze inserted between the sinus wall and the skull. Pressure is then removed from the lower end of the sinus, and if free hemorrhage does not occur from below a curette is inserted into the sinus and the clot removed from the bulb, care being taken, prior to this procedure, to apply pressure on the internal jugular in the neck so as to prevent the possible entrance of air into the vein. If the removal of the clot from the lower end of the sinus is followed by free hemorrhage, this is taken as presumptive evidence that the jugular bulb does not contain a clot. This free hemorrhage is, by no means, absolute evidence that there is not a clot in the jugular bulb, and that such a clot may not extend downward into the vein. From the series of cases reported, however, in which this plan has been followed it must be conceded that this view is well taken. In fact, several cases in which free hemorrhage did not take place from below, and in which the jugular was not interfered with, recovered completely after clearing out the clot from the sinus. Free hemorrhage occurring from below, a plug of iodoform gauze is inserted into the lumen of the sinus, packed firmly down into the bulb, and the remainder of the wound dressed in the ordinary manner. If hemorrhage does not take place from the bulbar end of the sinus, the surgeon should always proceed to excise the jugular immediately, unless the condition of the patient does not warrant this procedure, or unless the case has been under observation for only a few hours, and has shown no evidences of gen-

(1) Jour. Amer. Med. Assoc., Oct. 20, 1906.

eral septic infection. In either of these events it is better to return the patient to bed for a few hours, allow him to rally from the shock of the first operation, and subsequently to excise the jugular, if necessary. In cases where the general condition of the patient is good jugular excision should be performed at the first operation, if free hemorrhage does not take place from the bulbar end of the sinus.

In performing the operation it is well to place the initial ligature about the vein as low down as possible. The vein is most superficial just beneath the omohyoid muscle. In some cases, however, it is necessary to ligate the vein lower—that is, just above the clavicle—and in two instances Deuch has placed a ligature about the vein less than half an inch above the innominate vein. The excision of the vein should be complete from its lower point of section to a point as close to the base of the skull as possible. The upper end of the vein is divided well above the posterior belly as the digastric muscle.

All tributary veins must be divided between two ligatures during the procedure of excision. Any enlarged glands lying along the course of the vein, and in severe cases these glands are always present, should be thoroughly removed.

In two cases of brain abscess reported by T. J. Harris[1] respirations ceased at the time the abscess was opened.

In one of the cases the abscess was located in the cerebellum, and in the other in the tempero-sphenoidal lobe. In the first case respiration was maintained artificially for some time, and the heart continued to beat for five minutes. In the second case a tracheotomy was performed, and the breathing so restored for three hours.

J. S. Barr[2] reports a case of extradural abscess associated with paralysis of the sixth cranial nerve and double optic neuritis.

The patient, a boy of 17 years of age, had suffered from chronic suppurative otitis media for sixteen months.

The symptoms which excited alarm and led him to seek medical advice were (1) headache, which began a fortnight previously, chiefly frontal, but extending also

(1) Annals of Otol., Rhin. and Laryngology, December, 1905.
(2) Glasgow Med. Jour., August, 1906.

over the back of the head, it being more or less constant and at times very severe; (2) a feeling of chilliness or slight shivering, experienced several times about nine days before coming under observation; this never amounted to a distinct rigor; (3) sickness and vomiting which recurred several times when he experienced the slight shiverings; (4) double vision and squinting of the right eye for five days' duration. There was no vertigo with the exception of slight attacks following the syringing of the ear. There were no reliable data as to temperature or pulse before coming under notice.

When first seen patient, although pale and ill looking, was bright and intelligent, and gave ready answers to questions. His temperature was 98 degrees F. and pulse 70. He frequently covered his right eye with his hand to prevent him from seeing double.

He complained of headache. There was, however, no excessive drowsiness. There were no paralytic phenomena unless in the eye. The knee-jerks were not well marked and ankle-clonus was absent. There was no disturbance of taste or smell. The tongue was clean, but the bowels were constipated. The urine contained neither sugar nor albumen.

The eye conditions are as follows:

The right eye will not pass the middle line outwards; there is paralysis of the right external rectus, causing diplopia; otherwise the eye movements are normal. The pupils respond sluggishly to light and accommodation. The left pupil is larger than the right; when at rest it is about two-thirds dilated. The pupils retain the relative difference in size even when acting. Ophthalmoscopic examination with undilated pupils showed, in right or affected side, marked optic neuritis, optic disc swollen, vessels enlarged, etc., but the edges of the optic disc can be faintly made out. The swelling amounts to about 1.5 m.m. In left, the optic disc is more swollen than in the right, the edges blurred and vessels full. The swelling amounts to about 2 m.m. In neither were any hemorrhages seen.

In performing the radical mastoid operation a small amount of pus was found adjacent to the lateral sinus.

Three features of this case are specially worthy of at-

tention: (1) The absence of definite symptoms pointing to the exact nature and situation of the lesion present; (2) the presence of an intense double optic neuritis, only beginning to pass off four months after the radical mastoid operation and evacuation of the extradural abscess; (3) paralysis of the right sixth cranial nerve, which completely disappeared three months after operation.

1. Such symptoms as have been described, occurring in a patient suffering from chronic purulent middle ear disease, namely, optic neuritis, paralysis of the right sixth cranial nerve, headache, chilliness and vomiting, associated with normal temperature and pulse, seemed to be significant of some form of intracranial mischief. In considering the question of cerebral abscess, which the symptoms at first suggested, it was specially noted that there was no drowsiness nor slow cerebration; that, indeed, the patient was bright and intelligent, and that there was no involvement of the third nerve; while in considering the question of lepto-meningitis, or of septic sinus thrombosis, the absence of a high temperature, or of violent oscillations of temperature, seemed to exclude these grave conditions. The absence of pain over or behind the mastoid, and the normal temperature which existed, at all events while he was under our observation, seemed singular in a case of suppuration around the sigmoid sinus with involvement of its walls. In these diagnostic uncertainties it was evident that the first duty was to clear out the middle ear cavities and be guided by the condition found. This operation, which included the exposure of the sigmoid sinus behind and the duramater above, proved not only a diagnostic measure of great value but a most successful therapeutic one.

2. It is, of course, well known that optic neuritis is common in such intracranial lesions as brain abscess, lepto-meningitis and thrombosis of the lateral sinus, but to find it, and that on both sides and in so intense and persistent a form, associated with a moderately sized extradural collection of pus, is certainly much more rare. In looking over the literature of the subject it is noticed that Barker in his hunterian lectures on intracranial inflammations starting in the temporal bone describes a case very similar to this one; and other writers mention optic neuritis as a

possible accompaniment of extradural abscess, without, however, mentioning individual cases, or that they had found it in their own experience. It is to be remembered, on the other hand, and this is an important point, that a few cases have been recorded of optic neuritis occurring in persons with simple chronic middle ear suppuration and presenting no other symptom of intracranial or vascular mischief. Both Politzer and Barker report slight forms of such. This is well worthy of further investigation, and through the kindness of Dr. Rowan, the ophthalmic surgeon, Barr is at present engaged in the examination of the eyes of hospital patients suffering from middle ear discharge to determine whether any, and, if any, what proportion are the subjects of optic neuritis.

3. In regard to the third interesting feature there are very few records of paralysis of the sixth cranial nerve in connection with these intracranial complications of purulent ear disease. Knapp, of New York, describes in the Archives of Otology a case very similar to this one but different in so far that it was associated with a distinct diffuse lepto-meningitis and by the death of the patient. One would have expected that the sixth nerve would have been more frequently involved than the optic, when we consider the fact that in its long course from the lower border of the pons to the optic foramen it comes into much closer relation than the optic with the region of the sigmoid sinus and the cranial walls of the ear.

It is no doubt somewhat difficult to explain the exact pathological connection between such a comparatively small collection of pus in the neighborhood of the sigmoid sinus and the nerve lesions producing these ocular phenomena. The most ready explanation is that from the septic pachymeningitis around the sinus there extended, by microbic infection, more deeply a basal localized lepto-meningitis which, through the pia mater, involved the adjoining sheath of the sixth nerve or the more distant optic nerves.

S. Iglauer[1] reports a case of mastoiditis complicated with brain abscess with no history of discharge from auditory canal.

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(1) Annals of Otol., Rhin. and Laryngology, March, 1906.

The patient, a man aged 37, complained of pain in the left ear for seven weeks following a cold.

Status Presens.—Patient complains of earache and of headache referred to the left frontal region and to the vertex. The watch is inaudible; the voice is only heard close to the ear; Weber's test is referred to the left. There is redness and swelling behind the ear; the posterior auricular fold is obliterated; the mastoid is tender. There is a sinking in of the posterior superior wall of the auditory meatus. The ear drum is of a dull red color; bulges; there is no perforation and no pus in the meatus. The temperature is normal and pulse 84.

Diagnosis.—Acute mastoiditis.

Treatment.—Paracentesis was performed and a few drops of creamy pus came through the incision almost immediately. Ice bags were ordered over the mastoid. The meatus was packed with gauze. Patient returned next day with free discharge of pus, which had saturated the gauze. There was less tenderness over the mastoid. On the following day patient had a slight chill and a slight rise in temperature, the discharge continuing. He was sent to the hospital. The evening before the operation the temperature was 99 3-5 degrees, the pulse 84 and the respiration 20.

Operation.—September 8, 1905, the simple mastoid operation was performed. The cortex of the mastoid process showed a small perforation leading into the mastoid bone. The mastoid cells were not very numerous and were filled with pus and granulations. These were thoroughly removed and the operation apparently completed when a thin streak of pus was noted coming from the posterior portion of the operation canal. The probe was introduced at this point for about one-half inch. The fistula was enlarged, exposing a cavity about the size of a hazelnut, leading directly to the dura mater covering the region of the sinus. The dura was found thickened and covered with granulations so that the sinus was not visible. About a dram of pus was found in the cavity. This, undoubtedly, was an extra-dural abscess covering the sinus at this point. The wound was packed with iodoform gauze and partially closed with sutures.

The pain in the head disappeared almost immediately

after operation, and the patient has practically recovered entirely.

This case is interesting owing to the fact that we had a case of acute mastoiditis without perforation of the ear drum and complicated by extradural abscess. The only symptoms which might have suggested the latter complication were the severe, radiating pain, a slight slowness of cerebration and a certain nervousness which was attributed to loss of sleep.

Curability of Otogenous Meningitis. On the basis of a case of suppurative meningitis consequent on a suppuration of the internal ear and which improved distinctly after operation, although the patient finally succumbed to an abscess of the cerebellum, M. Lannois and A. Perretière[1] enter a plea for the surgical treatment of this affection which has been hitherto generally regarded as beyond the reach of therapeutics. They review the character of the disease and the history of its surgical treatment and reach the following conclusions:

Intervention is indicated in almost all cases. It should comprise the following steps:

1. A primary operation on the ear by which a radical removal of the auricular focus of infection is secured.
2. Opening of the cerebral or cerebellar fossa and exposure of the cranial dura mater.
3. Incision of the dura mater and drainage of the cerebro-cerebellar arachnoid cavity.
4. Lumbar puncture, which can be repeated if need arises.

Suppurative meningitis, hitherto considered beyond the resources of surgical skill, constitutes today a new operative field. The surgeon's duty is to meet the three following indications:

1. To prevent the production of otogenous meningitis by treating the causal lesion in time.
2. To be prepared for its appearance by search for the earliest symptoms by which it reveals its presence.
3. To avoid the dangers which it causes by applying to the meninges the methods and principles of general surgery. Certainly trephining will have the better chance

(1) Lyon Medical, Aug. 12, 1906.

of success the earlier it is done. Indeed, as Briege forcibly puts it, there is no contraindication except impending dissolution.

INTERNAL EAR.

E. Amberg[1] thinks the term "Meniere's disease" should be eliminated from otologic literature. The three symptoms, deafness, dizziness and tinnitus, which were prominent in the case Meniere reported, are also present in cases suffering from entirely different pathologic lesions. It is now recognized that these symptoms can be caused:

1. Through influences from the external and middle ear.
2. Through diseases of the labyrinth.
3. Through diseases of the brain and of the acoustic nerve; and
4. Through neurosis, *e. g.,* of the sympathicus (angioneurosis).

We do not speak of heart disease or of heart symptoms, of lung disease or of lung symptoms, nor of kidney disease or of kidney symptoms. We are expected to diagnose and name a recognizable affection of these organs more definitely, and if this is impossible, in some instances, we leave the question open with the understanding that further investigation is required to clear up some dark points. The same rule could be followed in otitis interna.

Conclusions.—1. The triad: Hardness of hearing, vertigo, and tinnitus is given as constituting the functional disturbance observed in the so-called Meniere's disease.

2. These symptoms occur also in numerous affections which are not based on the pathological finding as described by Meniere in his historical case.

3. The observation that not always a typical picture is present has led to the introduction of other terms, such as "Meniere's symptoms," etc., which has proved to be confusing.

4. Even affections of the middle ear, of the outer ear, or of other parts of the body, can cause the symptoms described by Meniere.

(1) Amer. Jour. Med. Sciences, July, 1906.

5. These latter causes can be diagnosed in many instances and prove the existence of a great group of affections characterized by functional disturbances of the inner ear.

6. By abandoning the terms "Meniere's disease" and "Meniere's symptoms" a more definite nomenclature can be introduced. This is important not only from a physiological and pathological, but also from a clinical standpoint. By using, for instance, the terms "otitis interna syphilitica" or "leukemica" or "angioneurotica" or "gastrica" a clearer conception of some affections would ensue.

7. The various terms should be agreed upon. The many international medical meetings give ample opportunity for such a procedure.

Diplacusis Disharmonica. The definition of this abnormality of hearing is a variation in the musical tone as perceived in the two ears so that an inharmonious sound results. E. Barth[1] discusses the theories advanced to account for this anomaly and describes a case which he believes disproves the view of Abt and A. Barth that the phenomenon is a result of middle ear disease. In the case cited there were all the signs of a labyrinthine affection and no indication of marked disease of the middle ear. The vibrating tuning fork when set on the top of the head was heard only by the sound ear and the affected ear heard better by air conduction than by bone conduction. The high tones of the Galton whistle were not perceived and the words with sibilants were not heard better than words without. Inflation with air did not improve the hearing, although in addition to the labyrinthian affection there was also a contraction of the tube. The patient could demonstrate the fact that the tones of an instrument were heard from $\frac{1}{4}$ to $\frac{1}{2}$ tone lower by the affected ear by singing after them with the sound ear closed. By treatment of the nose the displacusis was promptly removed while the nervous difficulty of hearing remained, but the author thinks that this does not justify doubt as to the labyrinthine nature of the affection.

E. Urbantschitsch[2] reports a case of *Menniere's disease following mumps* in a twelve-year-old deaf-mute whose

(1) Deutsche med. Wochschr., Nov. 15, 1906.
(2) Wiener med. Wochsch., June 23, 1906.

deafness was congenital and hereditary, her parents and a brother being also mutes. Abnormal auditory sensations had been perceived in the ears for several years. An attack of mumps occurred which was more severe on the right side on which it first occurred, but did not present any grave symptoms. Two weeks after the disappearance of the parotid swelling attacks of noises in the ears, dizziness, nausea and vomiting began to occur. These persisted for about a year and disappeared under the use of electricity, a small cotton covered moist electrode being introduced into the external auditory canal until it touched the ear drum and a current of minimum strength, 1/10 milliampere, applied for fifteen to thirty minutes with occasional interruptions.

Affections of the Inner Ear After Concussion of the Brain. The question has arisen of late whether changes in the ear may not be demonstrable which will serve as a sign distinguishing symptoms of traumatic from those of psychic origin in cases where an injury is claimed as the cause of the disease. In order to determine this question Rhese[1] has investigated 100 cases including recent injury as well as those in which years had elapsed. The methods of investigation included the usual methods of testing the hearing as well as physical examination of the entire body.

In cases of concussion of the brain, even where the hearing for whispered speech seems unimpaired, an affection of the inner ear is almost regularly demonstrable, so that the persistence of hearing for conversation must not be held to exclude an injury to the ear.

In recent cases the following group of symptoms is quite regularly found:

1. Nystagmus on looking toward the sound side or most marked in this case.
2. Abbreviation of bone conduction.
3. Abbreviation of the duration of perception by air conduction for the whole tone scale, with especial implication of the middle tones in the majority of cases.
4. Peculiar formation of the hearing relief as is shown by chart, *i. e.*, lowest position in the lower part of the scale, showing rise of the curve to C_3 from that point of a

(1) Deutsche med. Wochschr., April 19, 1906.

fall to C_4 or C_5 after it has ordinarily fallen markedly at one of the middle tones.

5. Simultaneous affection of both ears, although not to the same degree and striking similarity of the hearing relief on both sides often to the extent that the one is a facsimile of the other.

6. Reduction of the extent of hearing for the watch in a marked degree compared with that for speech.

7. The tendency to exhaustion in regard to the tuning fork, remarkable for its frequency sometimes in a degree equally marked for the uninjured ear, sometimes in an increased degree.

8. A positive result from Rinné's test.

9. Marked dilatation of the vessels on the upper wall of the auditory canal in a characteristic, constantly recurring form, in which a group of strongly injected straight vessels running from outside inward on the middle of osseous portion of the external auditory canal usually in the middle line, less frequently on the posterior superior wall of the auditory canal. These dilated vessels arising according to their position from the auricularis profunda were sometimes covered with very small petechiæ or blood clots or sometimes passed over a markedly dilated vessel on the *pars flaccida,* or more frequently on the *pars tensa* of the drum membrane behind the handle of the malleus. This dilatation of the vessels, with which in occasional cases small effusions of blood in the drum membrane were associated, occurred either exclusively or more markedly on the injured side.

These symptoms, in themselves not conclusive, form a characteristic picture in which nystagmus may be lacking and to which dizziness, disturbance of equilibrium and subjective noises may be added. If this syndrome is found even after the lapse of some time an injury to the head may be assumed. Nos. 1, 2, 5 and 9 are very persistent. The longer the time since the accident the more importance is to be attached to objective evidences such as scars, the history, etc. The less pronounced the characteristic picture the less likely the traumatic origin. The shorter the time since the accident the more importance is to be attached to the absence of individual symptoms. Subjective complaints in regard to the ear from traumatic causes

are usually accompanied by more or less loss of hearing. This is especially true for subjective noises, although dizziness and disturbances of equilibrium may persist for years in spite of good hearing power, but not usually in a degree which interferes with the patient's occupation.

Examination of the ear may confirm the traumatic origin of a vasomotor syndrome including tachycardia, dizziness and disturbances of equilibrium. The more pronounced the ear changes the more likely the traumatic origin and vice versa.

The inner ear is thus seen to be a nice criterion of the occurrence and degree of a concussion of the brain, even in cases in which the power of hearing has not suffered to a noticeable degree.

P. McBride[1] reports six cases of deafness due to hysteria and allied conditions. His purpose in reporting the cases and reviewing the literature of the subject is to show that hysterical deafness is usually if not always associated with some other definite stigmata—notably anesthesia extending over one side of the body or confined to the ear; although we may meet cases in which other evidences of hysteria, if present, are more or less hidden, so that diagnosis becomes a matter of extreme difficulty. Indeed so difficult is it, that the diagnosis is possible only after the disappearance of deafness. At best we may suspect, and in extremely favorable cases we may go a little beyond suspicion, but must always stop short of certainty. In investigating one of these cases the history must be gone into with scrupulous care, and then compared with the results obtained from hearing tests and objective examination. Any inconsistency must be carefully considered and weighed. The questions the observer must put to himself are:

1. Is there any marked discrepancy between the history and the results afforded by objective examination?

2. Do the history and manner of the patient suggest hysteria?

3. Do history and results of examination accord with any of the recognized forms of organic deafness?

4. Is there any evidence of sudden improvement of hearing when the patient is interested?

(1) Edinburgh Med. Jour., May, 1906.

5. Do repeated hearing tests give the same result?

6. Is there any anomaly of hearing? *e. g.,* does the patient with the good ear closed fail to hear a voice so loud that it ought to be detected by the closed ear? Does he or she hear the tuning-fork by bone conduction worse when the good ear is closed? Do hearing tests give varying results?

Investigation on these lines will give more accurate information than can be furnished by deductions from hearing tests alone, although of course these must not be neglected. Thus, we cannot conclude the case is not hysterical because bone conduction is not absent. It is difficult to reach any conclusion as to the hearing of sound of different pitch by an ear which is for the time very deaf. It is only when we can prove variations in the hearing power which are inconsistent with deafness depending on an organic change, that we begin to approach a definite diagnosis. The aurist, when a doubtful case presents itself to him, must pass everything in review and on the lines indicated attempt to discover some discrepancy and, having found one, must look for others. It is customary for writers upon rare affections to discuss the prognosis, but in suspected hysterical deafness, without other evidence of hysteria, it is the diagnosis which must be guarded, for the diagnosis only becomes clear when there is no longer a question of prognosis—in other words, when hearing has returned.

MISCELLANEOUS.

E. Amberg[1] reports eleven cases in which disturbances of the hearing function were associated with mental disorders. The cases reported are divided into four classes and the literature furnished two more classes.

Class I comprises cases of a chronic disturbance in which the disturbance of the function of the ear is most prevalent.

Class II represents cases in which a suppuration existed with either a general toxemia or a local irritation.

Class III represents cases of suppuration in which it cannot be stated with certainty whether the mental dis-

(1) Jour. of Mental and Nerv. Dis., September, 1906.

turbance was only an exacerbation of an existing affection of the mind or whether the toxemia caused the disturbance.

Class IV represents patients with a pronounced mental disturbance who suffered from affections of the ear and in whom a connection between the two is not apparent.

Class V, in which an accumulation of cerumen can cause mental depression and hallucinations.

Class VI represents cases in which intracranial pressure exists, such as would be caused by a fibroma of the auditory or facial nerves.

This subject is one which touches upon two great realms in medicines, otology and psychiatry, two fields in which a great many questions have not yet been answered. When we consider the many various expressions of the human mind, in health, influenced by heredity, constitution, education, environment and the various ever-changing waves of bodily disposition, we can easily understand how much more difficult the explanation of abnormal mental and bodily phenomena may become in disease, especially when the recognition of the continual or fundamental pathologic state is difficult, or impossible, sometimes just as difficult, or perhaps more difficult to recognize, and what is of still greater importance, when we must judge about the degree of disturbance which is to be held responsible for the result with which we are confronted. The situation becomes still more complicated if we take into consideration that the picture may be reversed in regard to the causative factor. The phenomena mentioned in some of the cases do not allow us to deny *a priori* the fact that the primary cause of a mental disturbance may be located in the ear. An ear affection may start the vicious circle composed of the ear affection proper, and *e. g.,* the neurasthenic or hysteric conditions, which latter, we know, may reach a form and a degree which sometimes allows us to classify the bearer even as insane.

Amberg offers the following conclusions:

1. The ear participates in the production of mental disturbances, directly and indirectly.

2. As an organ of sense, its functional disturbance may disharmonize the normal state of thinking.

3. The mental disturbance can be brought about in two ways: First, by causing hallucinations, second by

illusions, the influence of which is more or less strong, according to the predisposition of the afflicted individual.

4. Entirely different from these disturbances are those in which the ear and its surrounding parts are simply the place in which a toxemia is primarily created, or in which an abscess engages the vitality of the body.

5. Both conditions (3 and 4), while entirely different from each other clinically and pathologically, can produce mental disturbances and aggravate pre-existing mentally abnormal conditions.

6. It is very probable that also without a predisposition a mental disturbance can be created if, *e. g.*, the annoying subjective noises create a state of exhaustion, *e. g.*, neurasthenia.

7. These conditions are of great import from a forensic point of view and must be considered in declaration of witnesses.

8. We are confronted with the important question whether the consent to an operation is required of an adult patient whose mental activity is temporarily interfered with and who is unable to judge about his condition, also if the consent of the relatives is necessary in such a case.

9. The organs of hearing of inmates of insane asylums should be examined.

10. Patients suffering from mental disturbances who exhibit phenomena on the part of the organ of hearing should be examined not only for pathologic conditions of the ear, but also of other organs, *e. g.*, of the kidneys, on account of the fact that the disturbance in the ear, although in itself a new center, may only be a reflex disturbance.

11. The benefit of surgical interference in ear affections should be bestowed upon the insane in need of it.

Dysthyroid Deafness. It is a remarkable fact that deafness and dumbness exhibit a varied territorial distribution which indicates an endemic character in certain regions. Especially in certain parts of France and in Switzerland the number of deaf and dumb rise to between two and three hundred in 100,000 inhabitants. The ordinary number in other regions is from 35 to 70 per 100,000.

The ordinary causes of dumbness are no more prevalent in these endemic areas than in other sections, but the endemic prevalence of dumbness is found to correspond with a similar preponderance of goiter and other affections of the thyroid. This cause of deafness and dumbness has received only meager notices from those who have investigated the subject in general. The patients are not likely to be found in the ordinary institutions for the deaf and dumb, because of their generally defective intellect which makes them poor subjects for education. They are to be sought rather in institutions for cretinism, idiocy, or in private homes, and hence escape investigation to a large extent. The degree of defect of speech may be varied and it may be associated with all grades of lack of hearing, from slight impairment to complete loss. Some of the patients are so defective mentally that they could not speak if they could hear. They are dumb because they have nothing to say.

Deafness depending on the defective condition of the thyroid is due to a nervous lesion of the ear affecting the labyrinth or the brain and nerves, but showing no changes in the tympanum, the auditory canal, or in the nose and throat, to account for the defect of hearing. If any affection of these parts is found it is to be regarded as an incidental complication, having nothing to do with the essential disease.

E. Bloch[1] has undertaken an investigation of over a hundred of these cases, of which he presents a clinical summary.

Of the 100 cases, 9 could not hear whispered speech and heard conversation with difficulty or not at all; 18 heard a whisper, but at a distance of less than 40 in. with one or both ears; 71 could hear whispers fairly well, but failed to hear a watch tick at the normal distance, 8 m. (26 feet), and the majority heard it at less than 1 m. (40 in.).

All the investigated cases without exception had a reduction of the upper audible limit of the scale of tones. All uncomplicated cases showed a diminution of the duration of hearing a vibrating tuning fork set on the temple.

(1) Deutsches Archiv f. klin. Med., May, 1906.

Other methods of examination indicated that the difficulty of hearing did not depend on disease of the middle ear.

In the severest cases the defect of speech showed that the trouble with hearing had existed since early childhood. This was shown not only by the monotonous voice, but by such defects as lisping, stuttering, and stammering. These show a defect in learning to speak, due to imperfect hearing. Lisping is easily explained by the fact that the sounds that are imperfectly distinguished in lisping speech are made by the higher tones the perception of which is especially defective in nervous deafness.

Ninety-two of the hundred had some form of goiter; in two the thyroid was normal while in six the gland could not be felt. The form of struma appeared to exercise no influence on the appearance of deafness. Basedow's disease was not observed among Bloch's cases. The patients came as a rule from families presenting various forms of disease of the thyroid. The cases of absence of the thyroid showed marked evidences of cretinism (lack of skeletal development, myxedema, obesity, feeble intellect, etc.). The two cases with normal thyroids belonged to goiterous families, and in one a goiter developed while under investigation.

Of the 100 cases 45 were under the normal stature, 36 to a slight extent, 5 to a marked degree, while 4 were dwarfs; 33 showed signs of infantilism, and in none of these did menstruation occur before the sixteenth year. Marked obesity was noticed in 25 cases of varying ages, and among the 21 women it occurred during the menstrual age without reference to the climacteric. Enlargement of the pharyngeal and faucial tonsil was found, but not more frequently than in other cases attending an ear clinic. The examples of feeble intellect were not pronounced, doubtless because of the fact that such cases are not likely to be brought to such a clinic. The diagnosis of dysthyroid deafness should be made only after the failure to find other causes for nervous deafness. The presence of other signs of defective function of the thyroid gland confirms the diagnosis, but it is possible that this defect may in some cases be the first evidence of such a failure of function at a time when there are no other objective signs of disease of the thyroid.

The prognosis is of necessity doubtful, since the disease

or defect is of a chronic character and it is not always possible to determine how easily the underlying disease of the thyroid can be influenced by treatment. The older cases present a correspondingly less favorable outlook. One must not be too easily discouraged, as distinct improvement in the power of hearing may occur after long treatment.

Too large doses of thyroid tablets should not be given at first. The author does not exceed 0.6 Gm. (10 grains) per day for adults or 3.2 Gm. (3 grains) for children. Occasional pauses in the treatment are made, but the patient must be kept under the influence of the thyroid substance, as without such persistence in treatment no permanent benefit can be expected.

Facial Paralysis. L. Jacobsohn[1] reports a case of gunshot wound, the bullet passing through the face behind the lower jaw and emerging on the other side near the lobe of the ear. The wounds healed readily, but a swelling appeared on one side which necessitated an opening for the removal of some splinters of bone and a small piece of lead. This operation was followed by an inability to open the jaws beyond a small distance. To remove this difficulty an operation was undertaken which replaced the jaw in nearly its normal location. A double facial paralysis then developed. The jaw was altered in its position by the manipulation so the articular surface met the skull too far back, so that the lower teeth struck behind the upper. The facial paralysis is attributable to the effort of the surgeon to replace the jaw.

H. Neumann[2] discusses the etiology, symptomatology, diagnosis and treatment of facial paralysis due to disease of the ear. The affection of the facial nerve in consequence of disease of the external ear or of a catarrhal affection of the middle ear is very rare. The author reports a case of facial paralysis arising in consequence of a syphilitic affection of the ear. This came on after internal treatment with iodid and disappeared on a discontinuance of the remedy. A repetition of the sodium iodid caused a recurrence of the paresis of the left half of the face. The author explains this result as due to a

(1) Deutsche med. Wochschr., July 19, 1906.
(2) Wien. med. Wochschr., June 16, 1906.

hyperemia of the neurilemma, due to inflammatory action by the iodin. Paralysis of the face results more frequently from acute purulent inflammation of the middle ear than from catarrh, but the affection of the facial occurs most frequently in chronic suppuration of the middle ear. It results most frequently in those cases in which suppuration of the middle ear has resulted in caries of the middle wall of the tympanic cavity. The distinctions between a central and peripheral paralysis of the facial are as follows: In central paralyses the nasolabial branches are paralyzed while the frontal branches generally remain intact. The lids can be closed and the forehead can be wrinkled. The reflexes and the electrical excitability show no alterations. According to Nothnagel the half of the face that is immovable under voluntary effort may show motion under emotion as the voluntary innervation passes through the crus cerebri, but emotional impulses reach the periphery through the tegmentum. For a lesion in the crus a paralysis of the oculomotor nerve on the side of the lesion, together with an opposite hemoplegia, is characteristic. With a lesion in the anterior part of the pons there exists a facial paralysis and hemiplegia on the opposite side. With the lesion in the lower part of the pons there is an alternating hemiplegia: hemiplegia on the opposite side and paralysis of the facial on the same side. Nuclear lesions of the facial affect particularly the muscles of the lips. Erb divides peripheral facial paralysis as follows: If the posterior auricular nerve is unaffected and there is no disturbance of taste or hearing and no affection of the palate or of the secretion of saliva the lesion is outside of the fallopian canal. If the posterior auricular is affected the facial is diseased inside the canal, but below the origin of the chorda tympani. If the hearing and the palate are unaffected, but taste is disturbed, the lesion is above the point of origin of the chorda tympani and below that of the stapedius nerve. If the paralysis of the palate is lacking, but there is increased sharpness of hearing, the lesion must be above the point where the stapedius nerve is given off. If, besides a paralysis of all the external branches, there is also alteration of taste, increased acuteness of hearing and a paralysis of the palate, a lesion of the geniculate ganglion is present. The presence of

paralysis of the palate without disturbance of taste indicates a basal affection of the facial above the geniculate ganglion. According to Erb, the posterior auricular nerve which innervates the muscles of the external ear is given off below the stylo-mastoid foramen, so that one might conclude from the voluntary movability or immovability of the external ear whether the lesion is above or below the stylo-mastoid foramen. In making a diagnosis of facial paralysis of otitic origin the circumstance that in the majority of cases the facial paralysis is combined with a caries of the prominence of the horizontal semicircular canal and the patient, either from the history or clinically, indicates disturbance of equilibrium on that side is of importance. In a considerable number of cases complete deafness can be demonstrated, which indicates a secondary affection of the labyrinth. The prognosis of facial paralysis depends chiefly on the pathologic condition and the duration of the affection. The prognosis is distinctly more favorable in acute affections than in chronic. It depends also on the general condition and is doubtful when suppurative inflammation of the middle ear occurs in cachectic tuberculous and syphilitic individuals. Chronic suppurative processes in the middle ear afford generally an unfavorable prognosis if they are occasioned by caries of the temporal bone. The electrical excitability of the paralyzed nerves and muscles indicates the prognosis. The mildest cases are characterized by retention of the faradic excitability. The prognosis is even still favorable when a reaction of degeneration is already present if during the treatment the galvanic excitability increases. In these cases complete cure is to be expected from conservative treatment. Even severe injuries or total separation of the facial nerve may result in healing and restoration of function if the separated ends spontaneously unite or the opportunity for union (best by suture of the nerve) is afforded them. Atrophy of the muscles of the face and deformity of the affected half of the face afford an unfavorable prognosis. If facial paralysis occurs in the course of a suppurative inflammation of the middle ear it must be regarded as a serious symptom, since such a paralysis is often an early sign of an affection of the labyrinth.

Treatment.—The treatment must be varied according to

the cause, duration and location of the lesion. In so-called rheumatic facial affections the internal administration of salicyl compounds, assisted by galvanization of the nerve, is often sufficient to bring about a rapid cure. In exudative middle ear processes paracentesis of the drum membrane often induces a prompt removal of the paralysis. The electrical current is only indicated in acute cases when the inflammatory symptoms have disappeared. In protracted cases electrical treatment often affords remarkable service, and the same is true often of hypodermic injections of strychnin, massage of the muscles, etc. Syphilitic paralysis of the facial yields as a rule to specific treatment. In cases in which no cure can be obtained by conservative treatment plastic operations on the facial muscles and transplantation of the nerves should be considered. Alexander gives the following indications for this operation: Transplantation of the facial should not be undertaken in any case unless an attempt has been made for six months to restore the function of the nerve by massage and electricity. 2. After the lapse of this time all cases should be operated on in whom: (a) no voluntary motion can be obtained, (b) no faradic excitability can be shown, (c) the direct galvanic excitability of the nerve decreases in spite of treatment. 3. By transplantation after years of paralysis a result can only be expected when there still exists a remnant of direct galvanic excitability. 4. In all cases in which there is present galvanic excitability or a remnant of faradic excitability a period of conservative treatment is still justified. The hypoglossus and spinal accessory are the principal nerves which can be transplanted into the facial. The technic of facial accessory anastomosis is as follows: An incision over the base of the mastoid process along the retro-auricular furrow and the anterior border of the sternocleidomastoid. Ligature and section of the posterior auricular artery. The posterior border of the parotid is drawn forward and the styloid process, around the base of which the facial passes before it enters the parotid, is sought for. The posterior border of the digastric muscle is uncovered and the facial separated directly at the stylomastoid foramen. 2d. The search for the accessorius. The sternocleidomastoid is turned backward so that its under surface can be examined.

About two centimeters below the point of insertion of the digastric muscle and the mastoid process the trunk of the accessory nerve is seen. This is followed to its bifurcation into the sterno-mastoid and the trapezius. The branch for the trapezius is separated and the central end is united with the peripheral end of the facial with fine silk stitches on the external surface of the digastric muscle. The end is secured better by lateral anastomosis. This is accomplished by longitudinal incision of the sheaths of both nerves. The peripheral trunk of the facial is fitted laterally in the incision of the accessorius which has not been amputated and the corresponding edges of the nerve sheaths are united. The facial hypoglossus anastomosis is carried out by seeking for the hypoglossus after exposure of the facial. A horizontal cut is made in the subhyoid region. The nerve lies between the posterior belly of digastric and the anterior border of the sternocleidomastoid. The union of the ends of the two nerves is accomplished in the same way as for the facial accessorius anastomosis.

THE NOSE AND THROAT

THE NOSE AND THROAT

THE NOSE.

Paraffin. The *permanence of results* from paraffin injections in nasal deformities has been often called in question. In order to throw some light on the matter W. Downie[1] exhibited photographs of patients before the London Laryngological Society. These photographs were of patients on whom he had operated four years before. Compared with photographs of the same patients taken two weeks after operation they showed that the shape of the nose was practically identical at both dates. He says he does not believe the paraffin becomes absorbed, that it certainly had not in any of his cases, for the injected paraffin could still be felt as a well defined mass occupying the same site as it did immediately after injection. Further, in a case in which an excessive amount of paraffin had been injected he removed a quantity of it three years later. The paraffin was found in a fine state of division, in small rounded particles separated by bands of tissue.

H. Eckstein[2] prefers *hard paraffin* of a melting point above 50° C. (122° F.) and says that mixtures of hard and soft paraffin are to be avoided, as a paraffin melting at 50° gives better results than a mixture which melts at 56°. With hard paraffin no edema, no embolism and no absorption are to be feared. Of the two methods, injection is the better suited to cases in which the soft tissues, and especially the skin, permit of sufficient stretching to restore the contour of the part. In cases in which the skin is shrunken the desired result may be obtained by injections repeated at intervals; skin bound down by scar tissues can be freed by subcutaneous section with a tenotome. In cases which do not permit of these maneuvers implanta-

(1) Journ. Laryngol., Rhinol., Otol., March, 1906.
(2) Berliner klinische Wochsch., July 30 and Aug. 6, 1906.

tion is appropriate; it has the advantage of exact restoration of the deficient part, the use of a paraffin sufficiently hard that there can be no subsequent deformation, and the almost exact imitation of cartilage and bone; no absorption or embolism is to be feared; on the other hand, the disadvantages are the more difficult operation, a greater reaction and the resulting scars. Occasional failures from infection result. The best results are obtained by injection followed by a supplementary implantation.

Eckstein gives as his opinion, after an experience with about 2,000 injections in some hundreds of cases, that with proper technic paraffin prosthesis has yielded results in a wide medical field, in a safe, rapid and certain way, that a few years ago would have been deemed utopian, and the method is capable of farther extension. The employment of paraffin requires quiet, exactness, practice and good assistance, but with these both physician and patient will experience joy and satisfaction to the greatest degree.

As the conclusion of a lengthy report on the prosthetic use of paraffin in rhinology presented to the XVth International Congress of Medicine, at Lisbon, April 1, 1906, G. Malim[1] says: According to the results obtained during the last five years it may be asserted that:

1. Adhering to certain precautions, easy to take, in regard to the condition of the patient and the details of the operative technic, the use of this method does not appear to present in reality any serious danger.

2. The results obtained by the injection of paraffin in the tissues are permanent and seem most frequently to be definite.

For external prosthesis paraffins fusible between 45° C. and 55° C. are preferably employed heated. On the other hand, for restoration of the turbinated bodies, the injection, cold, of paraffin melting at 45° seems to be the operation of choice and constitutes at the present time the specific local treatment of ozena or fetid atrophic catarrh.

Telangiectasis. A. B. Kelly[2] describes two cases of multiple telangiectasis of the skin and mucous membranes

(1) Ann. des Mal. de l'Oreille, du Lar., du Nez et du Phar., May, 1906.

(2) Glasgow Med. Jour., June, 1906.

of the nose and mouth and cites 8 similar cases from the literature. Frequent epistaxis was a feature of both the author's cases. The patients were sisters, aged 48 and 40 respectively, and in both the symptoms began in girlhood. The older patient was frequently put on calcium chlorid and iron and seemed to derive benefit from them. She died suddenly from syncope induced by very severe and persistent epistaxis. The younger sister received benefit also from the calcium chlorid and iron treatment, but would not allow any local treatment of the lesions of the mucous membranes.

NASAL SEPTUM.

Deviation—Submucous Resection. The literature of this subject has been abundant during the year, but nothing new has been offered. The instruments and lines of incision are about the same as formerly, although nearly every operator devises one or more instruments to meet his own special difficulties. After another year's trial the opinion seems to become more established that the window resection is by far the best operation for nearly all septal deformities. However, it is observable that those of the older operators who were skillful in the use of the earlier methods of septum straightening are loath to admit that those methods are to be cast aside entirely in favor of the submucous resection. They grant that in many cases of septal deviation the resection method is the ideal one and they have adopted it with satisfaction. They urge, however, that in the case of a thin septum with a simple deviation an operation like the Gleason can be performed in 2 or 3 minutes and a perfectly satisfactory result obtained with a very moderate amount of after attention—scarcely more than is necessary after resection. This being the case, there would seem to be no reason why the long and tedious submucous resection should be used in such cases. They take the ground that there is still room for the exercise of judgment in the treatment of septal deviations as in all other surgical work and that a patient should not be required to undergo a severe operation when an easy one will answer every purpose. This is leaving out of the question the possibility of damage in some cases

from the removal of such a great part of the septum. This possible damage, although not demonstrable at present, may be very apparent in a certain per cent. of cases after the lapse of years. Of course, the man who has never done a Gleason or a Roe operation, but has done the submucous resection, is very likely to apply the latter in all cases and not consider any possible merits of the former or their applicability in selected cases. Here, as in all other cases, the man who has the judgment to select and the skill to do will have the least cause for regret as the years multiply.

The Killian single vertical incision anterior to the deviation seems to be almost universally adopted by those who have written, but a number of well known men follow the Freer L incision. In case of very sharp, angular deviations with the angle near the base of the septum some find it better to carry the horizontal incision clear back as far as the crest goes, thus gaining time and ease in operation and avoiding the danger of lacerating the flap in the endeavor to carry the dissection over the sharp angle. The only disadvantage will be the possibility of a narrow line of healing by granulation, and even this may not follow, as the redundant mucous membrane may be brought over the lower flap.

All admit that the necessity for removal of a large amount of bone at the back of the wound greatly prolongs the operation. From W. E. Casselberry comes the suggestion that to avoid the intolerable delay of the fragmental dissection of bone from far back the following expedient may be adopted in suitable cases: Having made the conventional submucous resection of the cartilage, maxillary crest, and vomer anteriorly, and having raised the muco-perichondrium of the bony concavity backward quite to its rear limit, saw off the projecting bony convexity. No perforation results, the muco-perichondrium of the concavity having been preserved, while the sacrifice of the fragment of mucosa so far back on the convex side is harmless.

J. E. Rhodes[1] believes that *Freer's method is the best.* He calls it the open method in distinction to the method

(1) Annals of Otol., Rhinol. and Laryngol., December, 1906.

by the single vertical slit of Killian. He maintains that by making the incision at the crest of the deflection and then dissecting an anterior L flap every step of the operation is made easier, the field of operation is under more perfect observation and the danger of perforation of the membrane of the concavity much less. More perfect drainage is secured during the healing stage, while the area for granulation is little more than when the single slit is used if the strip gauze is properly applied in packing the site of operation. Rhodes uses the Freer instruments and prefers the sharp elevators of Freer to the duller ones of other operators. He insists on the necessity for care in elevating the mucous membrane and perichondrium or periosteum together, as it is easy to make the mistake of elevating the mucosa and failing to get under the perichondrium and periosteum. If one fails to get the latter tissues in the flaps the result will be a septum so flaccid as to be easily movable by the currents of air in breathing.

J. Mouret[1] and J. Toubert[1] conclude as follows regarding the treatment of deviation of the nasal septum:

1. Deviations of the nasal septum are multiple and complex in form and extent.

2. The parts of the structure of the septum that take part in it vary according to the seat of the deviation.

3. The most rational classification of deviation of the septum is that based on the anatomy of the septum.

4. Deviation of the septum should not be confused with thickening of the septum or crusts or spurs.

5. The extent of a deviation cannot always be entirely foreseen on account of difficulty in examination.

6. Among known operative procedures most have given some happy results, according to the variety of the deviation treated, but one is always reliable and applicable to all cases—the submucous resection.

7. This operation always gives an excellent result if it is not timidly performed, and if all the deviated parts situated outside the median saggital plane are removed.

8. This is the only procedure applicable to deep bony deviations.

(1) Ann. des Mal. de l'Oreille, du Larynx, du Nez, et du Pharynx, June, 1906.

9. This operation is delicate and laborious, but it has no painful operative consequences for the patient. It gives a rapid and perfect result from the point of view of nasal permeability. It corrects quite well from an esthetic viewpoint certain external deviations and is not inferior in this respect to other procedures.

10. For all these reasons submucous resection of the skeletal portions of the deviated nasal septum, having proved its efficiency, deserves to take and retain an important place in the surgery of the septum of the nasal fossæ.

Very few voices have been lifted *against the submucous resection* during the past year. T. R. French[1] believes it is too early to assert that this operation is the only one for septal deformities. In the attempt to get a perfectly straight septum the temptation is very great to remove more of the cartilage than is safe, and sunken noses are not unknown as a result of such radical removal. He thinks that in children, during the developmental age, one should be especially careful in disturbing so essential a part of the nose. He thinks that some of the older methods, when properly followed, give fully as good results, although they do require prolonged after-treatment. In making incisions in the cartilage one should make them according to the line of deviation and should always make the cut oblique instead of with square edges, the oblique edges acting in a measure as flaps to hold the edges in approximation after the septum is pushed over. It is also to be remembered that simple incision and pushing over is not all there is to such an operation; the resiliency of the flaps must be thoroughly broken up if the final result of the operation is to be a straight septum.

Writing on deviation of the nasal septum J. R. Winslow[2] gives an analysis of 127 cases on which he has operated, nearly all being done before the development of the window resection operations. He believes the submucous operation cannot entirely replace the older operations and says if we should pursue the standard operations with the same assiduity and pertinacity as the submucous, aiming at improved technic and increased skill, we should obtain

(1) New York Med. Jour., Nov. 24, 1906.
(2) Laryngoscope, October, 1906.

in properly selected cases, by these less severe and exhausting methods, results in no sense inferior to those obtained by the submucous.

The use of splints is extremely objectionable and should be abbreviated or eliminated whenever possible. When the primary fracture is thoroughly done, especially if the nasal spine is fractured or incised, splints will be required for but a short time. Operations must be selected and adapted to individual deformities and it is often a difficult matter to decide which operation is best in a given case. Success is as much dependent upon good judgment in this respect as on marked operative ability.

There is no line of work in which the adage, "Practice makes perfect," is more applicable than in septal deformities; it is significant that the originators of these operations all claim better results from them than others obtain and that all operators report their accidents or failures mostly in their early cases.

Winslow says, "I, for one, am not willing to relinquish operations by which I am able to obtain satisfactory results in suitable cases in 5 or 6 minutes' actual operating time, in favor of those requiring 6 to 10 times that long and much endurance on the part of both patient and operator. Moreover, we will find many more patients who can endure the limited strain of these short operations than the prolonged strain of the submucous."

He further says, "Dissatisfaction with the new method is already appearing and I am sure that in a short time there will be reaction in favor of the older operations, and that in some cases a better result can be obtained by the old methods than by the new. Although the submucous operation belongs to the most difficult of nasal operations. all agree that it is indispensable and a method that every one who aspires to the title of a modern nasal surgeon must master."

Resection of the Nasal Septum in Primary Tuberculosis. A. Onodi[1] reports a case of primary tuberculosis of the nasal septum which presented such a similarity to carcinoma that the diseased part was removed for examination. The author refers to the various forms of treatment which

(1) Deutsche med. Wochschr., July 19, 1906.

have been recommended in case of tuberculosis of the nasal septum. The treatment for the most part consists in removal and curettement of the tuberculous granulation with a sharp spoon, followed by applications of lactic acid. Some observers have had good results from the use of lactic acid while others have come to the opposite conclusion. It is notable that after energetic and careful removal of the diseased portion frequent relapses have been observed. Onodi recommends, if the primary lesion has reached a large extent, that the nasal cavity should be opened in the middle line and, if necessary, an osteoplastic resection of the nasal bone and the frontal process of the superior maxillary and a resection of the tuberculous portions of the nasal septum should be undertaken. This method permits the discovery of a latent focus and the resection of the septum secures the radical removal of the lesion which could not be done by an ordinary curettement.

Septum Perforations. Perforations of the septum, whether from trauma, syphilis, tuberculosis or idiopathic ulceration, are often sources of discomfort because of constantly forming incrustations and occasional hemorrhage. M. A. Goldstein[1] says if a careful inspection is made of such a perforation it will be found, when the crusts are removed and the parts thoroughly cleansed, that the mucosa covering the nasal cartilage has been retracted on both sides from the edge of the perforation about the greater part of its circumference and that the cartilage projects beyond the mucosa edges. It is this feature which prevents the spontaneous healing of the sides of such a perforation. If Nature has succeeded in covering over the edges of the cartilage with mucous membrane there will be no crusts and no trouble with the perforation.

Goldstein conceived the idea that if the mucous membrane around the edges of the perforation were dissected up and the free edge of cartilage removed, thereby permitting the two layers of mucous membrane to come together and heal over the cartilage, a smooth union could be produced and the cause for the crusts and scabs would be removed. He states that the operation in a series of cases has been uniformly successful, the tendency to crust formation having been entirely removed.

(1) Laryngoscope, November, 1906.

In elevating the mucous membrane in the superior, inferior and posterior aspects of the circumference he uses a sharp Freer elevator; in dissecting the anterior part of

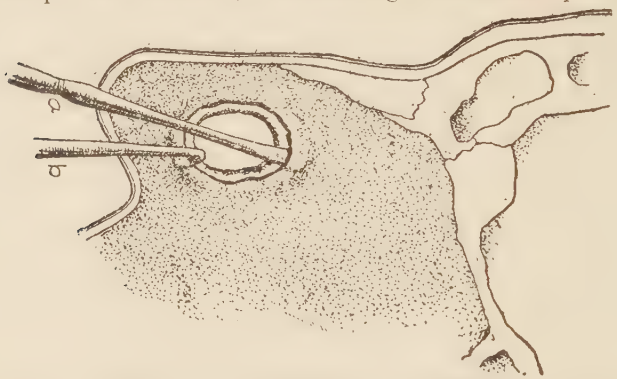

Fig. 28. Diagrammatic representation of perforation showing projecting rim of cartilage with straight and bent elevators in position. (Goldstein.)

the circumference he uses the same kind of elevator except that the operating edge is bent forward in an acute angle. For removing the rim of cartilage Ballenger's single-tine swivel-knife is the most satisfactory instrument, the ordinary double-tine swivel-knife being unsuited for the work.

Fig. 29. Diagrammatic representation of perforation showing the single tine swivel knife in position removing rim of denuded cartilage. (Goldstein.)

If the operation proves as successful in other hands as Goldstein has found it, it will be a very valuable suggestion for the relief of a troublesome condition. The method of

Fig. 30. Ballenger's single tine swivel septum knife.

procedure is shown in Figs. 28 and 29 and the single-tine knife in Fig. 30.

THE TURBINATED BODIES.

S. Yankauer[1] alludes to the various methods of removing hypertrophies of the turbinate bodies which have been used and the disadvantages possessed by all. These are, chiefly, the long time necessary for healing after the usual cutting or burning operations and the cicatricial tissue which finally covers the wounded surface. The author presents a method by which these disadvantages and also the discomforts of secondary hemorrhage are avoided.

The operation consists of two stages: 1st. The excision of the hypertrophied tissue. 2d. The suture of the wound. It is performed in the following manner:

After the use of cocain and adrenalin an incision is made with a knife above, and another below, the hypertrophy, the two incisions meeting at a sharp angle in front and behind. The included mass is then dissected out with elevators and scissors. Enough of the bone is then removed with punch forceps to bring the edges of the wound together. In some of the cases the entire mass, including the bone, was removed at one stroke with strong scissors, but owing to the retraction of the mucous membrane it was necessary to remove an additional strip of the bone. As the bone is very rough, especially near its inferior border, it is difficult to separate the soft parts in a satisfactory manner. The available scissors and punch forceps are also too thick and clumsy, so that this part

(1) Laryngoscope, February, 1907.

of the operation is tedious and consumes the greater part of the time. When the wound has been properly prepared, the edges are brought together with sutures. For this purpose number 0 catgut is used, sterilized by boiling it in a supersaturated solution of ammonium sulphate, as described by Dr. Elsburg. From 2 to 10 sutures were used, the average number being 5. The sutures were placed about one-fourth inch apart, beginning posteriorly and working forward. The nose was then packed with spunk impregnated with aristol powder. The various instruments used and the steps of suturing are illustrated in the article.

Cronzillac[1] concludes as follows regarding the operation of conchotomy:

1. If practiced with all aseptic precautions conchotomy is an operation devoid of danger.
2. If the operation is to be delicately made it must not be carried out rapidly.
3. It is preferable to employ local anesthesia with stovain or cocain.
4. That the use of adrenalin solution may entail considerable secondary hemorrhage, as may also the employment of bromid of ethyl.
5. The dressings may be made either with sterilized gauze or with sterilized penghawar. The latter gives less trouble and is more easily removed, but has the disadvantage that it may incite new formations.
6. Each time that there is pronounced nasal dyspnea with affection of the pharynx and disturbance of the general condition it is proper to re-establish the permeability of the nose.
7. Only conchotomy, by destroying hypertrophied turbinated bodies or those that approach too closely to the septum, can accomplish this result.

H. Gradle[1] advises partial turbinectomy by means of a guarded trephine. He uses this method in preference to the cautery, saw or scissors, where obstruction is caused by enlargement of the inferior turbinal or where the irregularities of the septum are not sufficient to warrant submucous resection.

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(1) Ann. des Mal. de l'Oreille, du Lar., du Nez., et du Phar., August, 1906.
(2) Chicago Med. Recorder, February, 1907.

H. L. Swain[1] writes of conditions producing rhinitis of various kinds and degrees. He thinks we are prone, perhaps, to attribute too much significance to slight deviations from the ideal normal in the nasal passages in the production of catarrhal conditions. One will see many times in older people badly deviated septa or marked septal hypertrophies without any accompanying nasal or pharyngeal or aural symptoms. There is a large personal equation in every case. The chances are that a moderate nasal obstruction which has produced no symptoms up to middle life will never do so. In the presence of marked catarrhal trouble of the nose, throat or ear, however, one is bound to give the patient the benefit of the operation which will best clear the nose. One will find, though, that some cases which it is expected that clearing up the nasal passages will cure will continue to have the nasal and other symptoms just the same as before. The best one can do is to use judgment in selecting cases and one's judgment should prevent his disturbing a nose even though it have a deviated septum, unless there are symptoms probably due to the crooked septum.

Dressings After Nasal Operations. The use of stypticin cotton (Merck) is recommended by W. Uffenorde[2] as a dressing after nasal operations to prevent hemorrhage. A piece of the cotton sufficient to cover the wounded surface is applied and held in place by cotton tampons, the latter being narrow enough to allow of the passage of air through the nose. After 2 or 3 days the dressing is removed. Before attempting to withdraw the dressing a hypodermic syringe full of hydrogen peroxid is injected into the tampon. After a few minutes the dressing is readily removed. The disadvantages of the dressing are:

(1) The taste of the stypticin, which slowly dissolves and passes into the pharynx, is very unpleasant.

(2) A portion of the cotton may adhere to the posterior part of the wound and give rise to very unpleasant symptoms if allowed to remain. The author has suggested to the manufacturers means by which these unpleasant features may be obviated.

(1) Annals of Otol., Rhinol. and Laryngol., December, 1906.
(2) Archiv f. Laryngologie u. Rhinologie, B. 18, H. 2.

Atrophic Rhinitis. J. Sendziak[1] contributes a statistical study on the *etiology* of atrophic rhinitis. He found the disease 1,142 times in 20,000 private and dispensary patients (about 5.5 per cent.). Dispensary patients showed 6.5 per cent., private patients, 5 per cent. Of these cases 782 were of the simple variety and 360 of the fetid. While other observers agree that the disease is found much more frequently in females, Sendziak's figures show about an equal division of the sexes. He believes the mutual relation between tuberculosis and atrophic rhinitis is very important and thinks the latter predisposes to the former. His figures show tuberculosis present in 7.4 per cent. of the cases.

He believes the parasitic theory best explains the conditions found in atrophic rhinitis.

M. Lermoyez[2] parallels certain cases of ozena in which the disease appears to have been transmitted from one patient to another, by similar cases of syphilis in which the contagiousness of the disease is held to be proved without doubt. He concludes that his cases of ozena establish the contagiousness of the disease as surely as the cases of syphilis establish the contagiousness of syphilis. He endeavors to show that no other theory of the disease accords with the facts but that which admits its contagious character. He believes that the cocco-bacillus of Perez answers the requirements of a specific causative organism. Its cultures produce a marked fetid odor. When injected into the veins of an animal it reproduces a fetid rhinitis.

He concludes that, like gonorrhea, the coccus of ozena first produces a purulent rhinitis which becomes chronic, resulting in sclerosis of the mucous membrane, and spreads to other parts of the air passages.

Patients with ozena should use strict precautions against the infection of others, especially of children.

G. L. Richards[3] writes of the unsatisfactory condition of the knowledge of the etiology and treatment of this disease. He has never found disease of the adnasal cavities as an etiologic factor, although he has sometimes found it as a complication. He inclines to Cozzolini's theory that

(1) Annals of Otol., Rhinol. and Laryngol., December, 1906.
(2) Ann. des Mal. de l'Oreille, du Lar., du Nez et du Phar., January, 1907.
(3) Jour. Amer. Med. Assoc., Jan. 5, 1907.

the disease has its beginning in the bone, the process beginning as an atrophy of the medullary blood vessels and especially of the arterial capillaries of the periosteal zone, then becoming a periostitis or a rarefying osteitis.

In regard to *treatment* he mentions a great many methods which have been recommended from time to time, but which have fallen into disuse. He states that the local therapeutics seems to reduce itself to a thorough cleansing of the nasal mucous membrane and the use of any application which produces a mild stimulation. The severer remedies do not seem to have any material advantage over the milder ones. He has seen apparent cures from long-continued treatment by the physician with the faithful co-operation of the patient. In discussing Richard's paper (Section of Laryngology and Otology, Am. Med. Assoc.) C. M. Cobb stated that he still adheres to treatment of these cases with the electrolytic needle, a method which he presented before the Section several years ago. O. T. Freer uses a hard-rubber irrigating tube for the nose and places the instrument in the hands of the patient. The instrument throws three fine streams and can be passed through the nose and into the nasopharynx. He uses the Gottstein tampon, instructing the patient how to make and introduce the tampons himself. After thorough cleansing he applies a freshly prepared paste of argyrol to every part of the nasal cavities. He has the patient use a 10 grain to the ounce mixture of salicylic acid in lanolin.

R. Sondermann[1] recommends the use of a tampon by the patient in the treatment of this disease. The tampon consists of a thin rubber bag with a tube attached. In the collapsed state the bag is introduced into the nose and is then inflated by means of the tube and the latter closed by cut-off. After 5 to 10 minutes the bag is deflated and removed, when the crusts will be found loose and easy to remove by simple blowing of the nose. During the first eight days the patient uses the bag twice a day, later once a day. The case is kept under observation by the physician and any of the usual remedies applied at these visits. The author claims better results from this method than from the usual douches in the hands of the patient, the douche

(1) Muenchener med. Woch., Dec. 4, 1906.

often failing to remove all the crusts and being not without danger to the ears.

Broeckaert[1] exhibited before the Belgian Society of Otology, Laryngology and Rhinology a patient whom he had cured of ozena more than three years before by *submucous injections of paraffin.* Five injections had been given. There had been no other treatment since, yet there were no crusts, no fetor and no headache and the sense of smell had completely returned. In the discussion following Lermoyez remarked that there was still a notable enlargement of the nasal fossæ, showing that the dilatation is not the cause of the ozena and that injections of paraffin do not act by reducing the caliber of the nostrils, but by modifying the nutrition of the mucosa.

Membranous Rhinitis. C. M. Robertson[2] reports two cases in children aged respectively 5 and 8 years. The membrane covered the inferior turbinate and its removal caused bleeding. No diphtheria bacilli could be found, but streptococci and staphylococci in one and staphylococci and influenza bacilli in the other. Temperature ranged from 100° to 102°. The ears became involved in both cases, suppuration ensuing.

Cold. A study of the *bacteriology* of a common cold is presented by C. H. Benham[3] as the result of investigations in 27 mild cases. Cautley, in 1894-5, isolated in 7 out of 8 cases of common cold a bacillus which he named *Bacillus coryzæ segmentosus.* Prosser White, in 1906, found a bacillus probably identical with Cautley's in 17 out of 21 cases. Hajek, Pfeiffer, Lord, and Dunn and Gordon have found an organism which they call *Micrococcus catarrhalis.* Cautley's bacillus is placed in the diphtheroid class. Benham offers the following conclusions from his investigations:

1. Both diphtheroid bacilli and the *Micrococcus catarrhalis* were present in this series of cases, but Pfeiffer's bacillus was present only in such small numbers as to be negligible.

2. Other organisms were present in much the same proportion as in normal throats and noses.

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(1) Jour. Laryngol., Rhinol., Otol., August, 1906.
(2) Laryngoscope, July, 1906.
(3) British Medical Journal, May 5, 1906.

3. The diphtheroid organism present conformed to the description given by Cautley of the bacillus discovered by him in 7 out of 8 cases of common cold, and confirmed by Gordon and Prosser White.

4. The diphtheroid bacillus isolated gave reactions in carbohydrate media which serve to differentiate it from diphtheria on the one hand and xerosis and Hofmann on the other.

5. The question of the exact symptoms, if any, caused by the diphtheroid bacillus and the *Micrococcus catarrhalis* respectively cannot be said to be settled. In view of the fact that nasal discharge was not a prominent feature of this series of cases, it seems likely that the diphtheroid organisms are rather a cause of a painful sore throat, with headache, malaise, and muscular pains, irritable cough, and scanty viscid expectoration. Whether they cause coryza—a cold in the head—is at least open to question, especially in view of the presence of *M. catarrhalis* in nearly half the cases.

6. It seems, therefore, best to give a name such as *Bacillus septus,* which does not assume a knowledge of the pathologic significance of the organism, or to refer to it as "Cautley's bacillus."

7. Its occurrence in as many as 95 per cent. of cases nevertheless makes it almost certain that it is of importance in the etiology of a common cold.

The author closes with the following suggestive remark: "In view of the recent work on diphtheroid organisms in general paralysis of the insane, I cannot help feeling that we are on the eve of a great advance in our knowledge of the pathology of some obscure diseases. Possibly even the common cold, neglected and despised, may be found to have a place in the etiology of some serious diseases, hitherto unexplained."

Tuberculosis from the Lower Meatus. H. Caboche[1] concludes: There exists a form of vegetating nasal tuberculosis arising from the inferior meatus which rapidly invades the tear ducts, thus constituting a naso-lacrimal tuberculosis. Functionally, it is indicated by simple nasal obstruction and epiphora. Objectively it is characterized

(1) Ann. des Mal. de l'Oreille, du Lar., du Nez et du Phar., Sept., 1906.

by hypertrophy of the inferior turbinated body, concealing fungous lesions of the meatus and rapidly leading to lacrimal fistula and cutaneous tuberculosis. Finally, it is necessary to insist on the necessity of making an examination of the meatus in case of epiphora either with the help of the author's speculum or the dilating speculum of Killian. In this way one may hope to disclose the lesion at its onset and by appropriate treatment to avoid invasion of the lacrimal passages and later of the skin.

In a case reported by the author the treatment consisted in the removal of the lower turbinated body, curettement of the meatus and the application of lactic acid. Concomitantly the tear ducts were treated by the usual methods.

Rhinoscleroma. Two severe cases of this disease, which were greatly improved or apparently cured by the x-ray, were shown before the New York Academy of Medicine by J. M. Ballin and S. Pollitzer.[1] One of the cases was of 16 years' duration. In Pollitzer's case the exposures were made three times a week for four weeks and then twice a week for four weeks. He says "the tumor simply melted away." Dr. Stern, in commenting on these cases, emphasized the importance of a proper technic in the application of the x-ray in this disease. The mass is very hard and unless the rays are properly applied nothing will be accomplished. He advises short exposures with high frequency rather than long exposures with low frequency. In his treatment of Ballin's case the exposures were of three to five minutes' duration.

Posterior Tamponade for Epistaxis. H. Naegeli-Akerblom[2] defines the indications for plugging the posterior nostrils in case of epistaxis and especially emphasizes the importance of removing the tampon after twenty-four hours. In illustration of this he relates a case in which great difficulty was experienced in extracting a tampon which had remained in place for four days. As the fine thread to which it was attached broke readily the tampon could not be extracted through the pharynx and the author finally made the attempt to bring the thread which had been passed through the nostril into the pharynx. This was accomplished by passing over it a soft Nelaton catheter

(1) Laryngoscope, December, 1906.
(2) Therapeutische Monatshefte, July, 1906.

which was stiffened by a straight mandrin and pushed through the nostril past the tampon until it could be grasped in the pharynx by forceps and the tampon thereby extracted. It is especially important that a strong but fine thread should be attached to the tampon by which the patient may withdraw it at the end of 24 hours. The presence of a coarser thread in the mouth causes so much discomfort that it is likely to be withdrawn before the proper time.

THE ACCESSORY CAVITIES.

Anatomy. E. Oppikofer[1] has studied certain unsettled anatomic questions in regard to the nose on 200 specimens with great care. The character and frequency of the inflammation of the accessory cavities, and especially the question whether the conditions found at autopsy were due to changes occurring during the final sickness or whether they are of a more chronic nature, was one question which he undertook to determine. Another was the frequency with which pavement epithelium is found in the nasal cavity, especially over the turbinated bodies. The latter question is of interest inasmuch as some authors have placed great stress on the discovery of pavement epithelium in the diagnosis of ozena. To determine this question serial sections of mucous membrane taken from the whole length of the turbinated bodies were made and examined with great care. Oppikofer embodies the results of his researches in the following paragraphs:

In the great majority of cases the floor of the antrum is lower than that of the nasal cavity. The occurrence of a pronounced alveolar inlet is the rule in adults.

A deep projection of all the roots of the teeth in the region of the antrum was observed only once in the 200 cases; the roots were all covered with a thin layer of bone. Only in a single case did a root of a tooth project free, without being covered by a layer of bone, under the mucous membrane of the cavity; it was the plump root of the wisdom tooth which had not yet erupted.

(1) Archiv f. Laryngol. u. Rhinol., B. 19, H. 1.

In two of the 200 cases the antrum was markedly contracted. In two other cases it was divided, once by a bony and once by a membranous septum.

The average length of the maxillary opening was 5.4 mm. (1/5 in.); the average width, 2.7 mm. (1/10 in.). The smallest ostium observed had a diameter of 2 mm. (1/12 in.); the largest was 17 mm. (7/10 in.) long and 11 mm. (0.44 in.) wide.

An accessory foramen is found in every ninth case and oftener on one side than on both; even in children an accessory foramen was observed relatively quite as frequently as in adults.

As a rule exploration of the maxillary ostium by sound is not possible. Sounding of the antrum from the middle meatus is preferable to sounding it from the lower meatus.

The antrum and the ethmoid cells were lacking in none of the 200 cases. On the other hand the frontal sinus was lacking in seven cases (three times on one side and four times on both sides) out of 190 cases in adults (3.7 per cent.) and the sphenoid antrum was absent in five (four times on both sides and once on one side), *i. e.*, in 2.6 per cent. of the cases.

The partition wall was lacking in the frontal sinus in two cases (1 per cent.) and in the sphenoid antrum in 14 cases (7.4 per cent.), so that a single cavity of variable size existed. Further, in some cases the septum was incomplete in some cases so that a free communication existed between the two frontal or sphenoid cavities. The latter anomaly was observed among the 190 adults twice in the frontal (1 per cent.) and six times in the sphenoid (3 per cent.). There are not only communicating frontal sinuses, but also communicating sphenoid antra.

An air chamber was found in the middle turbinated body in one case but not to such an extent that it caused a hindrance to respiration, and in only one and the same case was there suppuration in a bone cavity.

Inflammation of the accessory cavities is found frequently in the cadaver (94 out of 200 cases, *i. e.*, in every second or third case). Sometimes it is a catarrh; sometimes suppuration. Empyema was observed about every fourth case, but a close line between catarrh and suppuration cannot be drawn.

The observed changes in the sinuses were of a low grade. They exhibit acute terminal affections which have occurred in consequence of the weakening of the vital forces by the general disease. They are not found more frequently in infectious, including tuberculosis, than in other diseases running not too acute a course.

The acute or chronic nature of an inflammation of an accessory cavity cannot as a rule be determined at the autopsy. It is necessary to take into account the history and the rhinoscopic appearances noted before death.

As the cases of sinus inflammation revealed by autopsy are mostly of an acute character they cannot be compared with those obtained from clinical material, as this is chiefly drawn from operative cases and relates chiefly to chronic affections.

The majority of cases of acute inflammation of the accessory cavities arise as primary affections independent of rhinitis.

According to these statistics the antrum is most often affected (in 38 per cent. of the cases), then follow the ethmoid cells (in 18 per cent.). The sphenoid antrum is affected in 9.5 per cent. and the frontal sinus in 7.5 per cent.

Sometimes in the same individual only one cavity and sometimes several on the same side are diseased. An isolated sinus affection occurs in 55 sections (27.5 per cent.) and a combined in 39 (19.5 per cent.).

The 94 cases of accessory sinus affection were distributed more to the male (60 per cent.) than to the female sex (35 per cent.). Although in the first years of life these sinuses are not well developed, the autopsy shows an especial relative frequency of inflammation of these cavities in infancy, including both catarrh and suppurative lesions.

Polyposis of the nasal mucous membrane is not so very rare (among 200 cases 12 were found, 6 per cent.) and is localized chiefly in the neighborhood of the ostium maxillare. The polyposis was insignificant in 11 cases and was only in one case so marked as to interfere with respiration. One simple mucous polyp in an accessory mucous cavity was found and this was observed in the maxillary sinus.

This autopsy material shows in a manner free from objection that cases of ozena occur with completely healthy accessory cavities without any focus of suppuration.

Among leptoprosopic subjects there are a greater percentage of phthisical patients than among chamäprosopic.

In ozena pavement epithelium is regularly found. But this finding is not peculiar to ozena since extensive masses of pavement epithelium may be found in cases of ordinary chronic rhinitis without fetor or the formation of crusts, and even in nasal cavities which appear normal to the naked eye. Extensive strips of pavement epithelium indicate merely that some severe injury has occurred to the mucous membrane.

In ozena the amount of pavement epithelium is not proportional to the extent of hypoplasia of the turbinated bodies nor vice versa.

The metaplasia of the epithelium in these cases was independent of an inflammation of one of the accessory cavities.

To judge from one interesting observation in this series the carcinomata of the interior of the nose with pavement epithelium develop on the basis of a metaplastic mucous membrane.

The distribution of the glands on the lower turbinated body is irregular in normal cases. The number decreases from before backward so that the anterior third is distinctively richer in glands than the posterior.

The importance of the so-called intra-epithelial glands of the nasal mucous membrane has been overestimated, as they are almost regularly found even in the normal mucous membrane, although frequently only as single specimens.

In the normal and inflamed mucous membrane there are not infrequently found cavities in the epithelium of various size and form which arise from the destruction of a number of neighboring cells (degeneration cavities in the epithelium). The cavities are either empty or contain mucus or the detritus of cells and frequently cell nuclei; leucocytes also often migrate into the cavity.

A basement membrane is often lacking in the mucous membrane of the accessory cavities or is present only for a short distance. It may be found, however, in the mucous

membrane of an accessory cavity in the normal or inflamed condition.

Physiology. In an article on infections of the accessory cavities D. B. Kyle[1] says that from a general pathologic standpoint we should remember that these cavities are truly accessory and are not independent cavities and that they are accessory to the nasal respiratory tract, hence the origin of many pathologic lesions in the nasal cavities. We must remember, also, that these accessory cavities are dependent upon adjacent structures for nutrition. Also, when infected, you are dealing with a closed cavity, but not a cavity of new formation, hence the pathologic alteration is not subject to the same law as that of a cavity of new formation.

He says that when there has been a destruction of the mucous membrane of these cavities it is not likely to be regenerated owing to the fact that the blood supply to the submucosa is not as profuse as in the respiratory tract, and also that the genetic layer of the epithelial surface is less substantial and less capable of reproduction.

He has observed in a few cases where the accessory cavities had been freely opened that the pathologic alteration accompanying the process had not produced a permanent lesion, and when the cause was removed the mucous membrane returned to the normal. In such cases the practically closed cavity had been converted into a wide-open one and the patient suffered from symptoms almost identical with those of confined suppuration of these cavities, such as faceache, the neuralgia, sense of pressure, the general discomfort with, of course, no rise in temperature. One such case he had under observation for three years. This individual had six accessory cavities opened and the delicate, sensitive mucous membrane, which was not physiologically intended to come in contact with the air and dust, was particularly susceptible to the slightest climatic changes. It was found by placing the patient in a room with an even temperature that almost instant relief was obtained, apparently indicating that all the symptoms were produced by the use or misuse of these sinuses, as they are not intended as respiratory cavities. By the

(1) Annals of Otol., Rhinol. and Laryngol., December, 1906.

stimulation following the use of these cavities and the increase in the blood supply of the exposed mucous membrane as a result of this stimulation, the membrane gradually thickened, in other words, physiologically changed so that, while somewhat of a pathologic process, it produced a physiologic result and lessened the sensitiveness of the cavities and developed the membrane. The result has been that finally the patient has had practically no symptoms of any involvement of these sinuses.

Diagnosis. A difference of opinion has existed as to the power of the x-ray to demonstrate diseased conditions of the accessory cavities. In order to decide the question W. A. Chisholm[1] made a number of experiments with membranes and cavities containing a variety of fluids, pus, normal salt, gelatin, and air. By this means he was able to demonstrate the different density of shadows in the skiagraphs. A cavity containing air showed markedly less shadow than a similar cavity containing pus or other fluid.

His conclusions are that while no print can show the diseased condition as plainly as the original negative, it will show distinctly the difference between the normal and diseased sinuses and he believes the value of the skiagraph as an aid in diagnosis of these conditions can scarcely be overestimated. He believes his experiments prove that the characteristic appearance of a diseased sinus is due to the fluid contained, whether it be free in the sinus or contained in the thickened, edematous membrane.

A poor skiagraph is, however, useless, so that the method to be of value must be carried out by a skilled operator.

Operation. In an article on treatment of sinus diseases M. A. Goldstein[2] concludes with the following pertinent statement: "The summary of some of our best authorities in this field and those who have had most experience with sinus work is that 80 per cent. of all sinus cases can be cured by the intranasal conservative route. With the tendency always present in every field of surgery to espouse radical measures wherever the occasion presents itself, I would emphasize the importance of giving the concluding statistics, just quoted, careful attention; and would urge

(1) Annals of Otol., Rhinol. and Laryngol., December, 1906.
(2) Jour. Missouri State Med. Assoc., September, 1906.

that our patients be given as much consideration as our surgical ambitions."

M. Halle[1] presents methods of intranasal operation and asserts that nearly all cases of sinus disease, even of the frontal sinus, may be safely treated and cured by intranasal methods. Only in exceptional cases will external operation be required. The method presented by Halle[2] for entering the frontal sinus is very similar to that of Ingals. He uses a guide and a burr which are not comparable for safety and facility of use with the Ingals guide and burr. Singularly enough, he makes no mention of Ingals' operation, although the latter has been before the *American* profession for several years. A description of Ingals' operation is given in Vol. 3, Practical Medicine Series for 1906.

J. A. Stucky[3] describes eleven cases of accessory sinus disease in which *mental symptoms* were marked and in which complete relief was secured by radical operation. In all cases there was chronic empyema of the frontal and ethmoid cells and usually also of the antrum and sphenoid. The author states he cannot recall ever having seen a case of frontal or sphenoid suppuration in which the ethmoid cells were not also affected.

THE ANTRUM.

Acute Suppuration. A. L. Turner[4] describes three cases of acute suppuration treated by puncture in the middle meatus at the anterior extremity of the middle turbinal and washing with a mild lotion. The cases yielded promptly, only a few irrigations being necessary. No attempt was made to enter the same opening, but at each irrigation a fresh puncture was made, of course as nearly as possible at the site of the previous puncture.

Chronic Suppuration. H. Tilley[5] gives *intranasal puncture* as the easiest and only absolutely reliable test of antral suppuration. In chronic cases he does the Caldwell-

(1) Berliner klin. Woch., Oct. 15, 22, 1906.
(2) Laryngoscope, February, 1907.
(3) Medical Record, Nov. 24, 1906.
(4) Edinburgh Med. Jour., August, 1906.
(5) British Med. Jour., Nov. 17, 1906.

Luc operation—opening through the canine fossa and then removing the whole inner antral wall. He is careful to remove only such of the mucous lining as is diseased. He does not pack the antrum and closes the buccal opening at once by suture. After treatment consists of irrigating

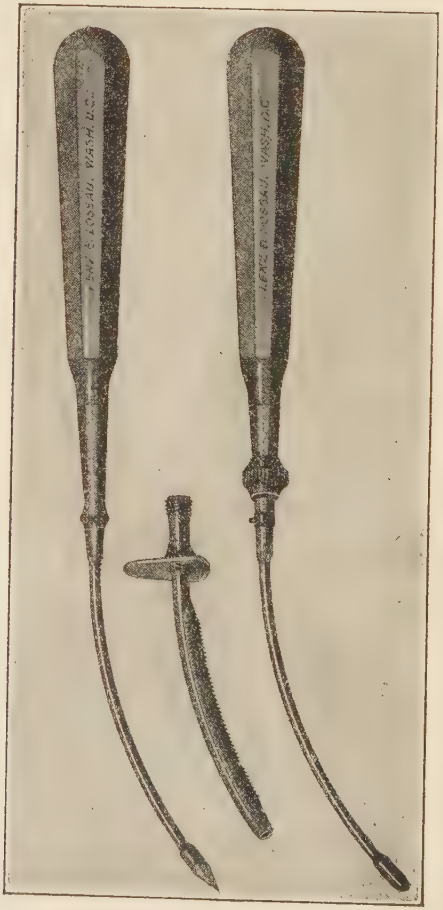


Fig. 31. Wells' trocar and canula with rasp, for making large opening in the naso-antral wall.

the nasal cavities with warm antiseptic alkaline solutions for 3 to 5 weeks after the operation.

H. H. Curtis[1] details two very severe cases to illustrate the excellent results obtained by removal of a large portion of the nasal wall of the antrum and treating through the nose. The method was described in this volume for 1903. Curtis states his belief that four-fifths of all cases of empyema of the antrum may be successfully treated without an anesthetic by the operation of removing the whole or a portion of the wall of the antrum forming the outer wall of the nasal cavity.

W. A. Wells,[2] while admitting that many cases of antrum disease are due to infection from the teeth, asserts that it is rarely proper to attempt treatment through the alveolus. If the first or second molar be badly diseased extraction should be done and if the socket is found to open into the antrum the opening may be enlarged and treatment carried out for a time through this opening. In general, however, he advises opening into the inferior meatus in chronic cases and also in acute ones which do not yield within a few days to irrigation through the natural opening or simple puncture in the middle meatus.

Wells removes the anterior half of the inferior turbinal with scissors and snare and then punctures the wall just in front of the part of the turbinal which remains. He uses a specially large curved trocar with a canula having a rasp on its curved surface. The cutting edges of the rasp are considerably elevated and quite sharp. With this instrument, after puncture, the opening is enlarged forward until the anterior wall of the antrum is reached. The opening should measure not less than $\frac{1}{4}$ inch by $\frac{3}{4}$ inch. Plates XIV and XV and Fig. 31 give a clear idea of the instrument and the operation.

This operation gives good drainage, also permitting curettage to some extent.

Wells claims to cure at least four cases out of five by this method, while in the cases not cured the hardest part of the Caldwell-Luc operation is done and all that is necessary is to open through the canine fossa for thorough curettement. After such curettement the cavity is packed

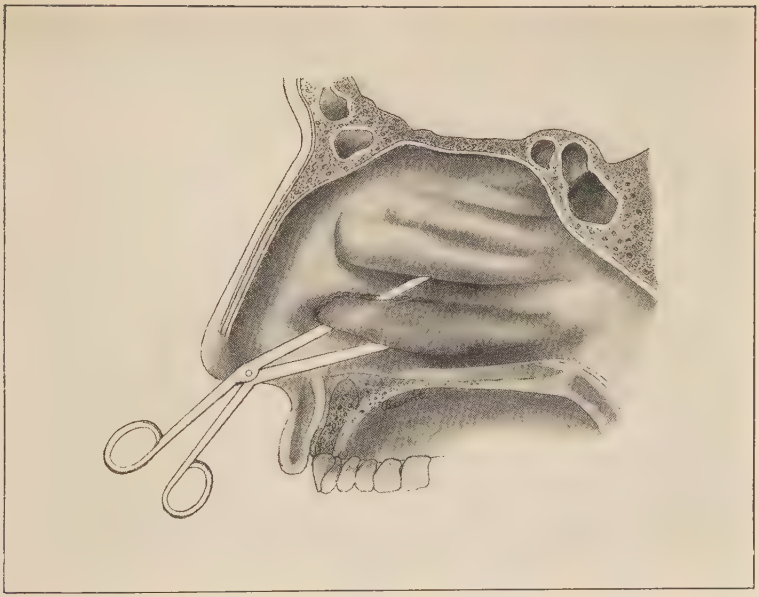
(1) Laryngoscope, July, 1906.
(2) Laryngoscope, December, 1906.

with gauze, which is carried through the opening already present in the nose, and the opening into the mouth is permitted to close.

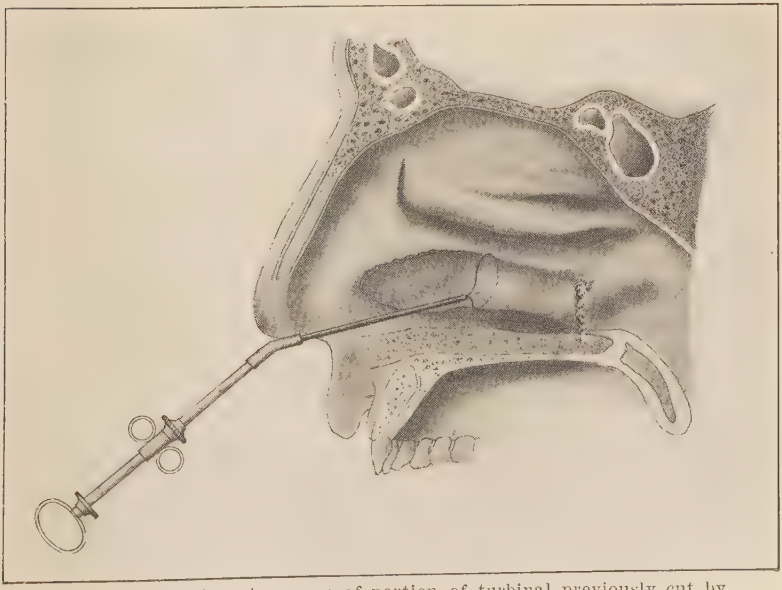
Oresco[1] recommends cleansing the antrum by *insufflations of oxygen gas* which he introduces through a needle with which he punctures the antrum from the lower meatus and washes out the cavity with a corrosive sublimate solution. The needle is then attached to an oxygen cylinder and the gas allowed to flow in under pressure, care being taken to regulate the flow so that it may not be too rapid. The oxygen acts as a disinfectant on the entire cavity of the antrum and the results have been very satisfactory.

F. R. Nager[2] discusses the advantages and application of *local anesthesia to antral operations* in Siebenmann's clinic. The nasal cavity, especially the lateral wall, is first thoroughly anesthetized by painting with 10 per cent. cocain and 1-1000 adrenalin solution. Then the maxillary sinus is thoroughly washed out with a Siebenmann's canula from the middle meatus and the liquid driven out by an air balloon. Through a similar canula 2 c.c. of Schleich's solution No. 2 (containing 1/10 per cent. cocain) with 3 drops of adrenalin in the 2 c.c. are injected into the antrum. In the middle meatus there is then laid a wad of cotton saturated with a few drops of 10 per cent. cocain and adrenalin. The anesthesia of the soft parts over the fossa canina is carried out by injecting as deep in the tissues as possible and under the periosteum two ampullæ each containing 1 c.c. of adralgin (Bloch). These contain in a sterile solution 0.011 gm. cocain and 0.1 gm. (one pro mille) adrenalin solution. For the submucosa 4 to 5 c.c. of Schleich's solution No. 2 with 3 drops adrenalin solution to each 2 c.c. are distributed in the fossa canina and in the course of the intended incision. After 10 minutes the operation may be begun. The incision in the soft parts is not felt and only the removal of the periosteum in the neighborhood of the point of exit of the infraorbital nerve is somewhat unpleasant and the patient feels the chiseling of the bone more as a concussion than as pain. The freedom from blood is remarkable and the

(1) Ann. des Mal. de l'Oreille, du Lar., du Nez, et du Phar., November, 1906.
(2) Archiv f. Laryngologie u. Rhinologie, B. 19, H. 1.

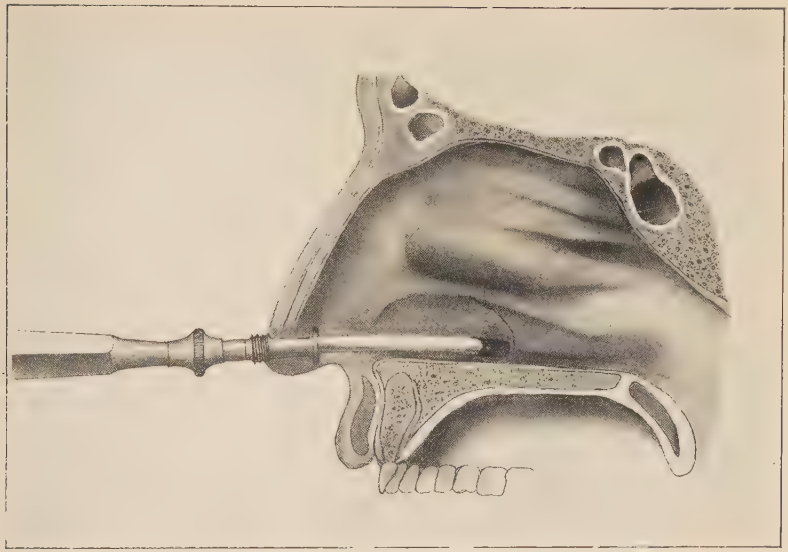


A. Scissors severing attachment of anterior part of turbinate from lateral wall. First step of operation.—Wells.

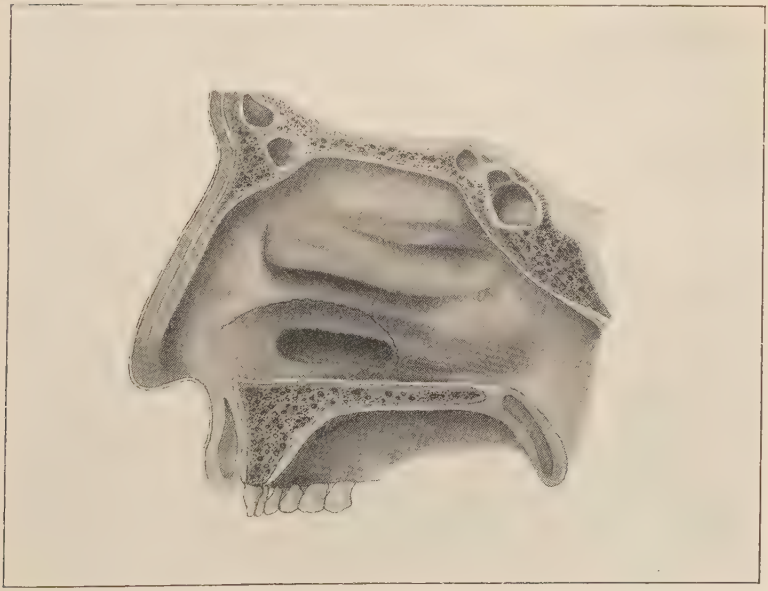


B. Removal by wire snare of portion of turbinal previously cut by scissors. Second step of operation (Wells). (Page 263.)

PLATE XIV.



C. Enlarging with author's rasp opening made by trocar in naso-antral wall. Fourth step of operation.—Wells.



D. Showing the completed operation. Drawings made from author's specimen.—Wells. (Page 263.)

PLATE XV.

operation is considerably shortened. The author's conclusion is that local anesthesia with anemification in the radical operation in suppuration of the antrum is an important and harmless method for the patient and the operator, and its application may be most warmly recommended.

Tumors. G. Engelhardt[1] reports a case of a tumor removed from the antrum which showed structures characteristic of the embryonic tissues from which the teeth are formed. As the only tooth which projected into the cavity was entire, the conclusion was justified that the tumor had its origin in some remains of the primitive dental tissue. Some embryonic cartilage was present in the tissue of the tumor, although no fully formed teeth were found, nor any indication of pulp tissue with special vessels, and there was no indications of enamel in proper relations with the dentine forming tissue. Epithelial structures were found, but it would appear that something had prevented the union of this epithelium with the tooth papilla. These peculiarities of structure lead the author to the conclusion that the tumor represents a development from embryonic dental tissue at a period when the enamel structures were not yet fully formed.

In some places the disappearance of the connective tissue and the papillary formation of the epithelial layers indicated an increased energy of growth in the epithelium, but other characteristics of malignancy were lacking and the subsequent history of the case justified the assumption of a benignant growth. The rapid increase and the tendency to recurrence of some tumors in the lower jaw have warranted the resection of the bone, but the course of similar growths in the antrum does not necessitate such extensive interference.

FRONTAL SINUS.

Chronic Empyema. H. Tilley[2] does a modified Killian operation in chronic sinuitis. His modification consists in not removing the floor of the sinus. The ethmoid cells are thoroughly curetted through the opening below the

(1) Archiv f. Laryngol. u. Rhinol., B. 19, H. 1.
(2) British Med. Jour., Nov. 17, 1906.

"bridge" of bone and the whole external wound is sutured at the close of the operation. After treatment consists of daily irrigation through the large nasal opening made by curetting the ethmoid cells. He maintains the opening by frequent applications of a solution of 50 to 100 grains of nitrate of silver to the drachm.

G. Ritter[1] describes his method of operating so as *to preserve the anterior wall of the frontal sinus* in case of radical operation on the sinus. As the source of suppuration may be in the ethmoid cells, a free opening from these cells and from the frontal sinus to the nasal cavity should be secured. To effect this it is necessary to remove the orbital process of the superior maxillary and to curette or remove entirely the ethmoid cells. In connection with this operation the removal of a small piece of the floor of the frontal sinus may give sufficient drainage of the sinus. In cases where the sinus is extensively diseased, thorough curettement or a so-called radical operation becomes necessary. This may be carried out from below in cases in which the sinus does not extend too high in the frontal bone, by removing the whole of the floor of the sinus and curetting through the opening thus obtained. In cases where the sinus extends so high that the upper limit cannot be reached by the curette a modification of this method is necessary. In these cases Ritter proceeds as follows:

Having removed the orbital process of the superior maxillary and the lacrimal bone if necessary, and having curetted the ethmoid cells, he removes the floor of the frontal sinus and curettes the accessible portion of the cavity. He then passes a probe to determine the height of the sinus and marks on the skin the point which corresponds to the upper limit of the cavity. An incision is then made in the skin at this point, the flap turned back and a horizontal cut is made through the periosteum and a canal dug through the bone into the sinus, the direction being from above downward and backward. This canal should have smooth walls and should be straight and of sufficient caliber to admit a small curette. Any backward projection on its anterior wall is especially to be avoided, as such a projection will prevent the entrance of the curette. A spoon

(1) Deutsche med. Wochsch., Aug. 9, 1906.

curette shaped like a boat should then be introduced and the walls of the sinus thoroughly curetted. This having been done, the incision in the skin can be closed, as the passage through the nose provides sufficient drainage. A gauze tampon is inserted in this canal and may be removed after 24 to 48 hours. It need not be renewed, as a rule. It may be necessary to curette the opening between the sinus and the nasal cavity to maintain its patency. The cosmetic result of this process has been excellent in two cases in which the author has applied it.

F. L. Jack[1] reports four cases operated upon by the Killian method in which very little deformity resulted. All the cases had exophthalmos and there had been a breaking of the abscess into the orbit, so that there seemed no question as to the necessity for the external operation. The pictures shown gave evidence of slight deformity.

In the discussion of the subject (Section of Laryngol. and Otol., Am. Med. Assoc.) C. G. Coakley stated that after any radical operation on the sinus there is always a considerable discharge from the nose for a number of months, but this ceases after one or two years. He thought the deformity after the Killian operation was usually very great, but it could be relieved by paraffin injections. H. P. Mosher favored the Killian operation. W. P. Eagleton had known of one fatal result after intranasal operation and one of severe infective arteritis, so that he thought the external method the less dangerous. G. L. Richards emphasized the difference in the views of patient and doctor as to what constitutes a cure. The doctor does not consider that he has accomplished a cure by removal of the middle turbinate and the securing of free drainage, if the discharge continues. On the other hand, the patient may say, "I have no more trouble or pain, I have always had catarrh," and he considers himself cured notwithstanding the continuance of the discharge.

E. F. Ingals did not criticise the external methods, but stated his belief that in most cases they are unnecessary. He believes his internal operation (see this volume for 1906) is as safe as any in any case where a probe can be passed into the frontal sinus and that it will cure a large percentage of the cases in a few months.

(1) Jour. Am. Med. Assoc., July 21, 1906.

J. A. Storck[1] reports two cases in which well marked gastric disturbance was due to empyema of the frontal sinus. The first patient, a man of 35, had suffered for a year from dyspepsia and had been much treated without relief. The author found the stomach in a practically normal condition except that in lavage pus was always found. The source of the pus was traced to the nose and a rhinologist found the frontal sinus diseased. Treatment directed to this cured the dyspepsia. The second case was in a woman of 47 who had suffered from nausea for two years and had lost greatly in weight. Here also, after some time, Storck was able to demonstrate pus in the stomach contents and the frontal sinus was again found to be the offending part. Treatment of the frontal sinus relieved the nausea, but the patient was not cured until after a change of climate. Active treatment of the stomach failed to give relief until after the sinus was treated.

H. Smurthwaite[2] reports a number of cases illustrating the etiologic significance of the enlarged middle turbinal in persistent headaches. Removal of the offending turbinal brought cure in each case.

THE SPHENOID SINUS.

Chronic Suppuration. St. Clair Thomson[3] reports two cases of cerebral complications of sphenoidal sinuitis resulting fatally, the etiology of the cerebral disease being established by autopsy. He has collected 40 similar cases from the literature and presents an exhaustive study of the subject.

The symptoms of sphenoid suppuration are often vague. The most common symptom is a more or less purulent catarrh, frequently post-nasal. The discharge may never be profuse and careful examination of the nose by a rhinologist may fail to detect sphenoid disease. Pain or neuralgia may be absent, intermittent or severe, and when present is not referred to any constant point. It may be felt in any part of the head. It may sometimes be dis-

(1) New Orleans Med. and Surg. Jour., February, 1907.
(2) British Med. Jour., Nov. 17, 1906.
(3) British Medical Journal, Sept. 29, 1907.

tinctly located in some other of the adnasal cavities. Thus Thomson mentions one case where a frontal sinus in which the pain seemed located was opened and found healthy. In another the antrum was similarly opened needlessly. In five cases the pain was so distinctly referred to the ear or mastoid that in three of them the mastoid was opened, in each case by a skilled otologist. In two cases the symptoms were so suggestive of sigmoid sinus thrombosis that this sinus was needlessly opened.

When cerebral complications occur the symptoms are those usual in cerebral infection.

Infection of the cranial cavity takes place through perforation of the bony walls through the bone diploë, through the veins, or by the lymphatics. Thrombosis of the cavernous sinus and basal meningitis are the commonest consequences and occur with equal frequency.

The author concludes that if the association of sphenoidal sinuitis with disease in the orbital and cranial cavities has not been hitherto more fully substantiated, this is partly due to the fact that neither physicians nor surgeons attach much importance to the condition of the nasal cavities, either at the bedside or on the post-mortem table.

Records not infrequently appear in journals of cases in which physicians express surprise at meeting with a case of apparently primary meningitis. Or one reads of a surgeon trephining a skull for symptoms of "cerebral compression," and at the necropsy he expresses his astonishment on discovering suppurative basal meningitis, which he is unable to track through the bone to the middle ear or elsewhere.

Another reason why this association is overlooked is that patients will frequently attend a rhinologist, or a throat clinic, when their nasal suppuration or their upper air passages cause them discomfort, but when complications supervene they are apt to go elsewhere and give no history of their nose or throat trouble.

Thomson expresses the hope that pathologists will more regularly carry the post-mortem examination through to the neighboring pneumatic spaces of the nose. No post-mortem examination is really complete without an investigation of the nose and its accessory sinuses. In cases of

headache, neuralgia, and intracranial inflammation, and in the presence of thrombosis of the ophthalmic vein or cavernous sinus, these cavities should be examined as regularly as are the ear and the eye.

In sphenoidal empyema H. Tilley[1] makes a very free opening in the anterior wall, but advises strongly against curetting the sinus, as it is unnecessary and may be very dangerous.

NASAL DISEASE AND NEURALGIA.

L. S. Somers[2] calls attention to the frequent association of nasal disease and neuralgia. The neuralgia may be due to pressure on the septum from an enlarged inferior or middle turbinate or from disease of one of the adnasal cavities. As he says, when during acute coryza or grippe, especially, the location of the neuralgia apparently bears some relation to a particular sinus, one may take it, with many exceptions, however, as an indicator of involvement of that cavity, but on this alone the diagnosis of sinuitis can never be made with certainty, nor can the relation of cause and effect be disclosed without more certain corroborative evidence.

In frontal or sphenoidal sinuitis, persistent occipital neuralgia may be a marked feature, or in either of these, with pathologic alterations of the ethmoid cells, neuralgia localized in the supraorbital or infraorbital regions, with marked tenderness of the orbit, is not infrequent. It must also be borne in mind that in many cases of neuralgia in which there is intranasal or sinus disease it does not follow that the former is dependent on the latter, for no relations at all may exist between the two, but the neuralgia is the result of other causes, the nasal affection being a mere coincidence.

Where the symptoms and history point strongly to involvement of one of the adnasal cavities as the cause of the neuralgia a diagnosis may usually be arrived at by the careful use of cocain and adrenalin and often the suspected cavity may be washed out through the natural open-

(1) British Med. Jour., Nov. 17, 1906.
(2) Jour. Amer. Med. Assoc., Sept. 8, 1906.

ing. When this is not possible simple puncture of the antrum in the middle meatus or removal of the anterior tip of the middle turbinal to reach the frontal sinus is quite justifiable. [The Editor has sometimes permanently relieved severe acute pain of this character by such simple operation and washing with hot normal saline solution even when no pus or mucus was found in the cavity.]

LUPUS OF THE MUCOUS MEMBRANE OF THE UPPER RESPIRATORY TRACT.

M. Senator[1] in treating this question cites in addition to his own experience the results of Mygind, who reports upon 200 cases from Finsen's institute in Copenhagen. The disease is found principally in youth and in females rather than males. It is generally complicated by lupus of the face and among 32 cases in which the disease affected the skin of the nose there were only two in which the mucous membrane had not been attacked. Mygind reckons that the mucous membrane is affected in 64.5 per cent. of all lupus cases. The extent of the affection of the mucous membrane cannot be estimated from the external appearances without examination. The two nasal cavities are not affected to an equal extent. The disease may begin primarily on the mucous membrane or on the skin and the recognition of the former origin is important, as it is often overlooked. The disease may spread from the exterior to the interior of the nose in three ways: 1. By continuity; 2, through the lymph or blood channels, and 3, by transferrence by the finger.

The chief points of localization are the introitus and vestibule. The opening of the nostril may be very much deformed or it may retain its normal contour but be so infiltrated as to lose its elasticity. As Mygind says, the cartilaginous septum is the seat of election for lupus, and it would appear as if in many cases the disease were first implanted here by the finger and spreads from this focus in various directions. Perforation of the septum may occur, but the method in which it is produced could not be determined. While Mygind found perforation in 29

(1) Berliner klin. Wochschr., May 28, 1906.

per cent., Senator found only 4 out of 35. The disease may also attack the nasal septum, the inferior turbinated bodies, and rarely the middle turbinated or the floor of the nasal cavity. It may also occur on the other mucous membranes of the upper respiratory tract and is quite frequently accompanied by disease of the lungs. Examination of the lungs should never be neglected. The diagnosis is generally not difficult and the prognosis with reference to life quite favorable, but with reference to healing it is bad, although improvement may be obtained by proper therapy. The author prefers energetic surgical treatment with applications of lactic acid, 50 per cent. solution.

MALIGNANT TUMORS.

Operation. A. Denker[1] discusses the three routes by which the interior of the nose may be approached for the removal of malignant tumors, namely, through the superior maxillary bone, or by separation of the maxillary bone, or, lastly, a division of the soft and resection of the hard palate. The author describes a new procedure by which the tumor is approached from the antrum. As a rule morphin and ether are used as anesthetics. The upper lip is drawn upward and outward by two blunt hooks and an incision through the mucous membrane and periosteum is begun 1 centimeter above the gum of the wisdom tooth and passes horizontally forward, turning about 1 centimeter from the frenulum of the lip in a gentle curve upward to the lower border of the pyriform aperture. The soft parts are pushed upward and held by two sharp hooks so that the outer surface of the superior maxillary to the lower border of the orbit and the vicinity of the pyriform aperture is laid bare. From the lower and lateral border of this aperture the mucosa of the lateral wall not only of the lower nasal meatus but also of the middle in front of the opening of the antrum is loosened. This separation extends somewhat onto the floor of the nose, so that the subsequent resection of the under part of the nasal wall of the antrum can be accomplished without injury to the mucosa. It extends backward to the posterior wall of the

(1) Muenchen. med. Wochschr., May 15, 1906.

antrum, in adults about 4 to 5 centimeters from the lateral border of the apertura pyriformis. The lower turbinated body is separated with powerful scissors and a wide opening of the antrum from the facial wall is carried out so that one cannot only see but touch all the recesses of the antral cavity. The nasal wall of the cavity is then removed so that the nasal cavity is now separated from the antrum only by the mucosa. The median wall of the antrum being removed, the entire interior of the nasal cavity lies open before one and it is easy to curette the ethmoid labyrinth and also the anterior wall and to lay bare the anterior wall of the sphenoid sinus and to resect it. The advantages of the operation are the possibility of exposing the origin and extent of the neoplasm, the avoidance of a solution of continuity of the skin and any deformity of the face, and the lessened danger of bleeding into the pharynx and consequent aspiration pneumonia.

Sarcoma. A plea for the more extended use of the electro-cautery in these cases is made by J. Price-Brown,[1] who gives a statistical study of the subject. He quotes from Harris, who, in a paper published several years ago, collected a series of 103 cases reported up to that date.

Harris' conclusions were that round-celled and spindle-celled sarcomata are about equally frequent in their occurrence; that the cartilaginous septum is the part most frequently involved, and that next to this, the middle turbinal body; that it usually proceeds from a well-defined pedicle; that the growth is soft to touch and bleeds easily; and that "sarcoma is a small tumor, usually pedunculated, and rarely multiple." In speaking of treatment, he says that while many cases require removal by external radical operation, there are others in which an intranasal operation alone is justifiable; but that no matter how treated, more than half the cases are ultimately fatal.

The author also quotes Halsted's graphic description of the symptoms: "The conspicuous absence of pain while the disease is confined to the soft tissues; the presence of epistaxis as a prominent symptom, the nasal obstruction so great that both breathing and eating become distressing to the patient, while speech becomes difficult and the senses of smell and taste are either lost or severely im-

paired, until finally, as the disease advances into accessory sinuses or the cranial cavity, pain becomes severe and continuous, and death either from sepsis or exhaustion is the result."

From circulars sent out to prominent rhinologists in Canada and the United States the author got definite reports of 51 cases in which operation was done. Of intranasal operations there were 19, with 6 permanent recoveries, 31 per cent. Of extranasal operations there were 33, with 8 permanent recoveries, 24 per cent. Or of all operated cases about 27 per cent. of recoveries.

Price-Brown has had four cases, all of which were operated upon intranasally with the electro-cautery. The first three made permanent recoveries, while the fourth died some weeks after the growth was all cleared out, apparently of sepsis of some kind. All were males, aged respectively 18, 20, 50 and 58 years. All were subject to severe epistaxis upon very slight provocation. With one exception, there was complete blockade of the affected nasal passage. By the process of exclusion, as well as by the signs and symptoms, the disease in three of the cases was pronounced to be sarcoma by competent medical authorities before the cases were referred to him for treatment; and in each of these two or more distinct microscopic examinations verified that the diagnosis of sarcoma was correct. In the remaining case histologic examinations were made and the case was pronounced a spindle-celled sarcoma. In this patient the growth was the smallest.

The author's method of procedure is as follows: After producing local anesthesia and anemia by the free use of cocain and adrenalin, a large tubular speculum is introduced into the nasal passage as deeply as possible, and then perpendicular incisions with the electro-cautery knife at a high degree of temperature are made into the basal attachment of the growth on the turbinal side. They are made as deeply as possible without producing alarming hemorrhage. The moment this threatens to be severe, the operation is stopped and temporary tampons inserted to control the bleeding; but almost invariably these are removed before the patient leaves the office.

On his return, one or two days later, the cauterized tissue is removed either by snare or forceps, and the parts

cleansed by sprays. Then anesthesia and anemia are again induced and the operation repeated. Thus, successively, piece by piece, and day by day, with the electro-cautery blade at almost a white heat, the sarcomatous tissue is dissected away, working gradually from before backwards, until the posterior naris is reached; and the patient, to his delight, is able to blow his nose through a free passage again—something he has not done before for months, perhaps for years.

Owing to the sessile nature of the tumor removal by snare, knife or scissors is difficult or impossible in large growths.

The author concludes his article as follows: "Granting then that the external surgical operation rarely results in permanent cure, and that internal operation, neither by knife, nor snare, nor scissors, nor curette, nor all combined, can remove successfully a large sarcoma having an extensive attachment; why not accept the electro-cautery knife as the instrument of excision, when by its judicious and patient and regularly repeated use, the work can be successfully and safely accomplished, for the time at least? Not only can this be done, but by the removal of the sarcoma in this way, we have the additional advantage, over an external operation, of retaining a wide, patulous nasal cavity, through which the growth can again be attacked and destroyed if recurrence should take place.

"The claim I make is, that inasmuch as a large majority of the cases of nasal sarcoma originate in the soft tissues of the nose—even Freeman's case, described so graphically, illustrates this point—they can at any time be operated upon with the electro-cautery, provided the bony framework of the nose has not become affected with the disease. That in many of these cases a cure can be accomplished by thorough and careful and painstaking treatment, and that even in cases usually considered inoperable, great beneficial relief can in some cases be secured to the patient by the same means."

Disappearance of Sarcoma. It is well known that tumors exhibiting both the clinical and microscopic attributes of malignancy sometimes disappear spontaneously, but these cases are not common enough but that any well

authenticated case is of much interest. R. Levy[1] reports such a case in a woman of 73. The growth appeared in the nose and when complete obstruction occurred a part was removed and the microscope showed small, round-celled sarcoma. Iodids over a period of 2 months were negative, as were also erysipelas toxins. Radical operation was ruled out because of the extensive involvement,. Later, however, the patient's condition was so uncomfortable that she begged for whatever temporary relief might be secured from operation. The nose was cleared out with cold wire snare, galvano-cautery snare, scissors and forceps. Bleeding was profuse. The right tonsil was cleared of all suspicious tissue. Several days later the cautery was applied to the small projecting nodules in the roof and outer wall of the nose.

There was immediate improvement in the general health. In three months there was recurrence in the nose and metastatic growths in the legs. X-ray treatment was now tried without avail. The tissue in the nose was removed twice in the next 3 months. The nasal symptoms now increased in severity and became so bad that nothing further was attempted and the patient was left to await the end. She was not seen again for nearly a year, at which time the nose was found absolutely free of any growth, nothing in the throat and even the metastases in the legs were all gone but two. The growths began to return in the legs a month later and the patient failed rapidly, dying of exhaustion 8 months later. There was no return of the growth in the nose.

The microscopic examination was made by W. C. Mitchell, of Denver, and W. H. Welch, of Johns Hopkins. Levy gives a synoptic report of a considerable number of similar disappearing tumors that have been reported in the literature.

THE NASOPHARYNX.

Herpes of the pharynx, angina herpetica, or herpes gutturalis is a relatively commonly observed localization of herpes, occurring, however, less frequently on the faucial

(1) Annals of Otol., Rhinol. and Laryngol., December, 1906.

tonsil, and its isolated occurrence on the larynx is a rare affection, while, according to Hasslauer,[1] an example of this affection confined exclusively to the pharyngeal tonsil has not been reported in the literature. The reason for this is probably largely the difficulty of examination of the pharyngeal tonsil in acute diseases. For this reason he reports a case of localization of herpes exclusively on the pharyngeal tonsil. The patient stated that he had an attack of chills with pain in swallowing about a week before entering the clinic. He complained of increasing difficulty of hearing on both sides as the result of a severe nasal catarrh. There was little constitutional disturbance, the temperature was 38.1° C. (100.5° F.). There appeared to be marked nasal obstruction, the speech had a distinct nasal twang, and on the right ala nasi and angle of the mouth there was a somewhat marked herpetic eruption. The nasal mucous membrane was little changed and showed only increased secretion of mucus. The faucial tonsils and the posterior wall of the pharynx were reddened at their upper portion, but otherwise presented no abnormalities. The nasopharynx showed an unexpected condition. The pharyngeal tonsil was considerably enlarged so that the choana could only be seen in its lower third and only a small portion of the nasal septum was visible. The tonsil was markedly reddened and covered with a number of vesicles of the size of a pin head which showed partly clear watery and partly turbid contents. The vesicles were throughout of the same size. This condition explains the extreme obstruction to nasal breathing and left, with the accompanying herpes of the upper lip and the nostril, no doubt as to the nature of the disease. Two forms of herpes of the upper air passages should be distinguished. An infectious and a nervous form. The present case appears to depend on infection, as neuralgic complaints were lacking as well as the unilateral character that is characteristic of zoster. The course of the disease was favorable and the process ended after 10 to 14 days. Treatment consisted in daily irrigation of the nose with a solution of permanganate of potassium and subsequent insufflation of sozoiodolate of zinc into the nasopharynx.

(1) Archiv f. Laryngol. u. Rhinol., B. 19, H. 1.

[The Editor is satisfied that acute inflammation of the pharyngeal tonsil is a not infrequent cause of fever, especially in children. He has recently observed a case in a child of 7 in which a fever running as high as 103.6° continued for 5 days with insufficient localizing symptoms for diagnosis. Typhoid was strongly suspected. On the fifth day the symptoms of nasopharyngeal obstruction became marked enough to attract attention. An alkaline spray was then used in the nasopharynx with considerable force, causing an abundant discharge of thick mucus but no pus. The symptoms at once ameliorated and within 16 hours the fever was gone. This is the second case seen by the Editor within a short time in which inflammation of the pharyngeal tonsil caused symptoms suggestive of typhoid fever.]

Pharyngeal Tonsil. O. T. Freer[1] presents a new instrument and method for adenectomy. He speaks of the difficulty of removing all of the growth by means of the curette, there being practically always a curtain of tissue left at the front of the vault just where it most obstructs the nasal passages. It is also often impossible to reach the tissue in Rosenmüller's fossæ by the curette.

If one uses forceps through the pharynx it is almost impossible to guide the instrument by the finger, since the

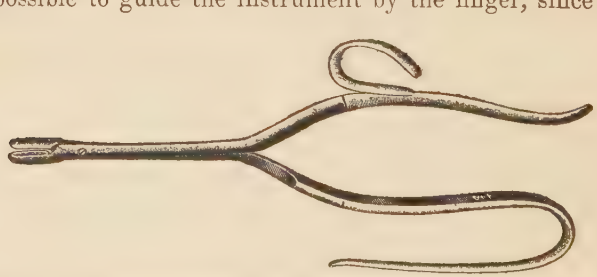


Fig. 32. The pernasal forceps for the removal of adenoid vegetations.

nasopharynx is not ordinarily capacious enough to admit the forceps and the finger at the same time. Freer alludes to the danger of bringing the operation into disrepute by imperfect removal of the growths, a speedy recurrence taking place in cases where any considerable portion of

(1) Annals of Otol., Rhinol. and Laryngol., December, 1906.

the lymphatic tissue is allowed to remain. He believes the most perfect removal can be accomplished by means of the finger in the nasopharynx as a guide, while operation is done by forceps through the nose. Figs. 32 and 33

Fig. 33. Lateral view of a sagittal section of the head, showing the finger in the nasopharynx guiding adenoid vegetations into the jaws of the pernasal forceps introduced through the nose.

show the instrument and the method. The operation is, of course, best done under general anesthesia, although the author says in adults and older children who are very courageous it can be done with cocain analgesia.

Freer thus describes the method of procedure: "General anesthesia combined with local cocain anesthesia is employed, the child being barely in half narcosis, while a good deal of reliance is placed on the local insensibility obtained by means of a small amount of a 10 per cent. spray of cocain introduced into the nostrils when the child begins to go to sleep. When the narcosis is sufficient a gag is inserted, the child is placed on its left side with its left arm behind it, the head is thrown well back, the face is brought

clear to the edge of the table and is slightly inclined downward so that the blood can run out of the mouth and nose.

"The finger is then introduced into the nasopharynx, while the forceps, with its side looking towards the roof of the child's nose, is introduced through one of the nares, following the septum and nasal floor, very slight force being needed to make it pass through the posterior naris to reach the index finger in the pharynx (Fig. 33). The forceps is then turned so that its broad side looks towards the vault of the pharynx and the jaws are widely opened while the index finger guides as much of the adenoid growth into them as they can hold; they are then firmly thrust into the base of the mass and, with their cutting edges, partly tear and partly cut it off. The forceps is then turned so that its side looks towards the roof of the nose and is withdrawn, the removed piece of tissue being dropped into a glass of boric acid solution.

"The procedure is repeated through the same and the other nostril, until no more adenoid growths can be felt with the finger and the beak of the forceps encounters firm, fibrous tissue over the entire site of the growth. The vegetations in the fossa of Rosenmueller (recessus pharyngeus), those on the posterior pharyngeal wall, those in the highest part of the pharyngeal vault, and the adenoid growths in the posterior nares are all readily reached and torn away. By crowding the beak of the instrument into the growths their removal to the bottom of the lymphoid tissue is assured, and there is no difficulty in entering hollow places in searching for it. The index finger is withdrawn from time to time to give the child a spell of unobstructed breathing. The operation is not lengthy and may be performed in a few minutes, the forceps often taking the greater part of the mass of the pharyngeal tonsil in one bite. The accuracy with which pendulous growths may be guided into the jaws of the instrument is most pleasing, as well as the exactness with which every vestige of adenoid tissue may be removed from the places inaccessible to the ring-knife mentioned. The precision with which the forceps does it work is due in part to the constant control of its presence by the palpating ball of the index finger, the finger and the forceps, as

it emerges from and recedes towards the nose, constantly meeting in concerted action. An attempt to feel similarly the post-nasal forceps while it is seizing the growths is always imperfect, as the presence of the instrument and finger in the nasopharynx at the same time is a hindrance to both, especially in small throats, and where control by palpation is attempted at all it has usually to be done with the nail and not the ball of the index finger.

"One of the chief advantages of the per-nasal forceps over the post-nasal one and over all other instruments operating by way of the mouth is that it pushes the adenoid growths out of the posterior nares, making them accessible and attacking their foremost part where the obstruction to nasal respiration is greatest, while the tendency of the post-nasal instruments is to crowd the vegetations forward into the choanæ beyond their reach. This became strikingly evident to me in the cases where I finished operations begun with the post-nasal forceps by means of the per-nasal one, which pushed out of the posterior nares and removed astonishingly large remains of adenoid tissue after I had deemed all of it taken away with the post-nasal forceps.

"The tubal prominences in the operation through the nose are not in danger, as they may readily be felt and protected by the index finger. As in all things, experience is required to learn to perform it rapidly, but I have had no difficulty in teaching the method to my assistants and pupils. I have never known of the return of the adenoid vegetations after this operation, and the children all cease their mouth-breathing after a few days to a week."

Adenoids in Old Age. Tumors in the nasopharynx in advanced life are much more likely to be malignant than of a simple lymphatic character; hence the report of three cases in persons aged 60, 65 and 66, respectively, in which the growth was proved by microscopic examination to be simple adenoid tissue is of interest. The cases are reported by P. G. Frank,[1] who refers to many other similar cases recorded in the literature.

All three of the patients presented symptoms common in the disease—nasal occlusion, running at the nose and

(1) Archiv für Laryngologie u. Rhinologie, B. 18, H. 2.

deafness. The symptoms, which had been present for from six weeks to several years, were all relieved by operation.

Polypi. G. Killian[1] has seen 22 cases of choanal polypi. These are usually solitary, of large size and more resistant than the ordinary nasal polypi. The author was struck by the varied views as to the point of origin of these growths and the apparent lack of exact knowledge on the subject. He therefore began to investigate the matter. Careful observation of his last 8 cases led him to the positive conclusion that these choanal polypi originate in the antrum of Highmore, the neck of the polyp passing out through an accessory opening.

Sarcoma. The prognosis of this disease is so uniformly bad that its suggested treatment by J. E. Rhodes[2] with adrenalin merits consideration. Rhodes reports an inoperable case in a woman of 22 treated by this agent. The patient had had a growth removed from the back of the throat 5 years previously which had been growing for 7 years. All symptoms were relieved after the operation until 7 months before Rhodes saw her, at which time enlargement began and steadily increased. The nasal passages were completely obstructed; there was marked deafness, severe pains radiating to the vertex, great emaciation. Tonsils, uvula, palate, tongue and larynx normal. The tumor mass extended as low as the level of the laryngeal vestibule. It was firm but not hard, somewhat lobulated, pinkish white in color, surface mottled with bright red spots. It did not bleed easily and there was no ulceration.

The author's treatment consisted of injections with adrenalin chlorid. The solution used contained .005 gram (5/64 grain) in 10 minims. Of this 5 minims were injected by means of a needle passing through the nose. Two days later 10 minims were injected. He used seven injections at about daily intervals. Diminution in size of the tumor showed itself after the second injection and improvement in the local symptoms continued steadily. The patient grew steadily weaker, however, and was sent home, where the injections were continued by her family

(1) Lancet, July 14, 1906.
(2) Annals Otol., Rhinol. and Laryngol., September, 1906.

physician, he giving 1/25 grain daily, except one day, when he gave 1/13 grain. He also gave a total of seven injections. While the local symptoms were all greatly improved the patient grew steadily weaker and died about 6 weeks after the first injection.

On account of the marked local effects Rhodes considers the remedy well worth further trial in inoperable nose and throat cancers. He quotes favorable reports from Mahu and Berdier and Falabert.

From his experience he thinks 1/25 grain is a safe dose for injection and that 1/13 grain is safe in some cases.

THE MOUTH.

Disinfection. Wadsworth[1] has been investigating the value of various substances as mouth disinfectants with especial reference to pneumonia. He found that most of the mixtures used as mouth washes have little, if any, disinfecting or germicidal power, normal salt solution or simple alkaline solutions being fully as effective as any of those generally used. Wadsworth determined that diluted alcohol is the best disinfectant for the mouth. He recommends 30 per cent. of alcohol in water with a little glycerin and salt. This solution acts as a real disinfectant.

Leukoplakia Oris. M. Joseph[2] says that there is no disease of the mouth which has excited so much discussion as leukoplakia oris, both because of lack of agreement as to the real nature of the disease and on account of lack of uniformity in the clinical picture itself. He regards it as strictly a primary affection not in any way dependent on syphilis and to be sharply distinguished from similar appearances that are the consequence of secondary changes in syphilitic papules or ulcers. The true leucoplakia appears as a white or bluish or pearly white spot on the tongue or mucous membrane of the cheek that stands out in strong contrast with the mucous membrane of the surrounding parts which has its normal red color. The spots are quite small but have a quadrangular or polygonal out-

(1) Jour. Infectious Diseases, Oct. 30, 1906.
(2) Deutsche med. Wochsch., Aug. 23, 1906.

line, and even in the beginning have the appearance as if they were laid or stuck on the normal mucous membrane. Slowly in the course of years the patches enlarge by growth at the periphery so that they come to form a coating on the tongue or cheek. With their growth they assume a tough hardness so that the term leukokeratosis seems applicable. With this increase in size the subjective symptoms, which were trifling at first, become more prominent. The tongue feels as if encased in a coat of mail, is immovable, and on eating or drinking, especially of acid or highly seasoned foods, sharp pains ensue which often last for some hours after the meal. Fissures form, which are peculiarly painful. The diseased area forms a favorable ground for the development of cancer, which hastens the fatal result.

Syphilitic scars are distinguished from these lesions by the fact that they are sunk beneath the surface instead of being raised above it.

The etiology of this disease appears to be an injury produced most frequently by smoking, acting on the mucous membrane of a person in whom there is a peculiar predisposition to keratosis of the epithelium, which is shown by its coincidence with psoriasis, ichthyosis, etc.

Treatment should consist in the permanent abandonment of tobacco, the frequent use of gargles, cleaning the teeth twice daily, the avoidance of all irritation and every irritating application. Joseph has had good results from the use of lactic acid, beginning with a 5 per cent. solution and advancing to the use of a 50 per cent. solution if no inconveniences are occasioned by it.

THE TONSILS.

In a study of the faucial tonsil J. G. Wilson[1] states that the normal tonsil is probably about ¾ inch long by ½ inch broad and ½ inch in thickness. From comparative anatomy he reaches the conclusion that the tonsils in man are not vestigial organs, since they appear in a higher state of development in man than in any of the lower animals. It is true they reach maturity early, but in this

(1) Jour. Amer. Med. Assoc., May 26, 1906.

respect they agree with lymph glands generally, which are more active physiologically in early life. He thinks the healthy tonsil has a definite function. He says the general belief seems to be that in the tonsil we have a definite organ, part of a ring of follicular tissue which surrounds the upper part of the alimentary canal at a point which, from its location and structure, is very open to disturbance and infection, whose physiologic function is connected with active processes at the beginning of the alimentary tract. One function may be to act as a defensive barrier against micro-organisms and, it may be, against other injurious bodies; and in these processes the lymphocytes and leucocytes may exert no unimportant part. We are too apt so to magnify the pathologic importance as to diminish the physiologic consideration. It is well to give the tonsil some thought, not as a frequent seat of inflammatory trouble, and therefore a constant source of danger and a menace to the individual, but as part of a group of active glands placed in an area susceptible to disease. Such a view does not preclude the possible necessity for the removal of a tonsil should it be diseased. If this gland become the center of recurring inflammatory attacks, if its mucous covering is obviously a nidus for micro-organisms, if its size is hurtful to the development of the individual, if, in short, it is obviously no longer physiologic but pathologic, as a pathologic structure it requires appropriate treatment.

Tonsillitis. C. F. Kieffer[1] offers a new treatment for tonsillitis the object of which is to secure comfort during the attack, speedy convalescence and immunity from subsequent rheumatic attack.

He has studied the records at Fort Russell, Wyo., where he is stationed, and finds that the army records kept there for 38 years show 2,275 cases diagnosed as acute tonsillitis and 1,293 cases diagnosed as acute articular rheumatism. They show that tonsillitis and rheumatism were both most prevalent at the same season of the year. In 276 cases of articular rheumatism there was absolute record of preceding tonsillitis, a proportion of 21.3 per cent. Leaving out a few cases in which the period elapsing between the two

(1) American Medicine, September, 1906.

diseases was as long as 35 to 60 days the average time elapsing between the attack of tonsillitis and the onset of rheumatism was 24 days.

Acting on the relation shown in these records, Kieffer sought a line of treatment based on the probable rheumatic nature of tonsillitis.

Nearly all forms of the salicylates were tried with only partial results. Finally acetyl-salicylic acid (aspirin) was used. In trying this drug its well known properties, first of dissolving in weak alkaline solution, and second of breaking up into nascent salicylic acid in the presence of alkalis, were thought of. To his surprise, investigation of the tonsillar secretions in acute follicular tonsillitis showed practically, without exception, that these secretions were sharply alkaline. Notwithstanding, the plan of treatment finally evolved included the free use of a saturated solution of sodium bicarbonate on the tonsils as a detergent. This was followed by the free local application of finely powered dry acetyl-salicylic acid (aspirin) directly to the tonsils. At first a number of patients also received acetyl-salicylic acid internally, but as experience was gained in the treatment it was found that the cases in which the drug was used locally only did exactly as well as the others. Hence the internal use of the drug was discontinued. The treatment of acute follicular tonsillitis in the hospital he summarizes as follows: On admission a full mercurial purge is given. Thereafter the throat is cleansed with a gargle of a saturated solution of sodium bicarbonate. In those patients who cannot use a gargle freely and easily a spray is employed. Immediately following the gargle finely powered acetyl-salicylic acid is rather firmly applied to the tonsil with a cotton tipped wooden probe. This method might advantageously be replaced by the use of a powder blower with a vigorous blast. Applications are made thrice daily.

The immediate results of this treatment have been extremely satisfactory. Anyone who has experienced the disease will agree that there is hardly any other acute affection in which the attendant malaise reaches so high a degree and in which the local suffering, which marks every effort at deglutition, is so constant and annoying. With this plan of treatment complete local comfort may

follow the first or second application of the remedy. The most striking change takes place coincidentally in the appearance of the tonsils. The redness and swelling rapidly disappear and usually within 20 hours the tonsils become very markedly blanched; and they are blanched to such a degree that they may appear even paler than the normal tonsillar tissue. These appearances also involve in most cases the pillars of the fauces. With these changes the patient usually becomes entirely comfortable and convalescence is rapid and uninterrupted. No secondary erosions and ulcerations are observed. The average duration to complete convalescence has been about three days.

But most important results seemed apparent in the way of preventing postanginal rheumatism which was after all the purpose with which the study had been begun. After eliminating all doubtful cases there were 120 cases in parallel series of 60 cases each. These series were made under exactly the same conditions and were carried through simultaneously, the patients being taken in alternation as they appeared for treatment. In the first series the patients were treated locally with most of the plans of treatment commonly used in acute tonsillitis, such as guaiac, hydrogen dioxid, tincture chlorid of iron, sodium bicarbonate, Monsel's solution, glycerin and capsicum, in conjunction with fever mixtures and refrigerants. In this series the average duration of the disease was six days; many of the patients had extensive swelling of the neck and fauces with severe constitutional disturbances. Superficial and deep ulcerations of the tonsils were common. Nine of the patients subsequently developed acute articular rheumatism, or 15 per cent. of the total number. In the other series treated with acetyl-salicylic acid, as described above, the average duration of the disease was three days. No such extensive swellings were observed; there were no severe constitutional disturbances and no tendency to erosion of the tonsils. There was almost complete abolition of the unpleasant odor usually observed on the breath of these patients. Finally, in this series not one case of rheumatism developed.

Vincent's Angina. L. W. Ladd[1] reports 4 cases of this

(1) Cleveland Med. Jour., June, 1906.

disease. The symptoms are those of a subacute sore throat in a case of average intensity, though the clinical picture may be complicated by mixed infection. Headache, general malaise, chilly sensations and fever are present, though the temperature rarely is higher than 102.5°. The breath is foul; there may be considerable tenderness of the throat, especially upon swallowing, and often there is considerable enlargement of the submaxillary glands.

In a case of average severity the symptoms abate in from three to four days' time, though the local appearance of the throat may persist for a variable length of time. The duration varies from a few days to six weeks.

The prognosis is good, depending for the most part upon whether a mixed infection is present or not, and if so upon the nature of it.

The disease may be associated with diphtheria, syphilis and the ordinary streptococcus and staphylococcus infections of the throat.

In the diphtheroid form of this disease Vincent states that there is no ulceration but simply a membranous inflammation in which only the fusiform bacilli can be isolated.

The ordinary staphylococcus and streptococcus inflammations of the throat differ from Vincent's angina in the usually more severe constitutional disturbances in the former, the absence of the fusiform bacilli and spirochaete; the greater tendency to ulcerate in Vincent's angina.

The diagnosis is made from the presence of fusiform bacilli and spirochæte in significant numbers and the absence of other organisms.

The treatment consists in the local application of tincture of iodin, silver nitrate or some other antiseptic solution in conjunction with frequent gargles, the abstaining from solid food while the throat is sensitive and the observance of a moderate degree of quarantine until the throat clears up.

General Infection. The subject of general infection through the tonsils continues to be a matter for investigation. J. L. Goodale[1] presents records of 9 cases of cervical lymphadenitis seen recently in which his opinion was

(1) Laryngoscope, December, 1906.

sought as to the influence of the throat conditions on the cervical disease. While in most of the cases (in small children) the tonsils were not much enlarged, yet in 7 the tonsils when removed and examined by microscope and inoculation showed the presence of tubercle bacilli, and in one of these the adenoid showed the same condition. In the other two no evidences of tuberculosis were found, but the cervical glands became normal shortly after removal of the tonsils and adenoids. In most of the tubercular cases the glands did not disappear after removal of the tonsils but had to be excised.

As Goodale says, these cases demonstrate that tubercular cervical adenitis may exist in association with the presence of tubercle bacilli in the tonsils with or without visible changes in these structures, and is not necessarily affected by the removal of the tonsils. It is also demonstrated that a form of cervical adenitis occurs, accompanied by distinct enlargement and subacute or chronic inflammation of the tonsils, which disappears after excision of the tonsils.

In the first instance it appears reasonable to assume that a penetration of tubercle bacilli through the tonsils into the lymph glands has occurred; in the second, that an absorption of irritating material generated in the tonsils is taking place from them into the adjacent lymph nodes. In the latter instance the removal of the focus of toxin production is followed by immediate relief.

In an article on the *relation of the tonsil to infection and infectious diseases* R. C. Brown[1] maintains:

That the tonsil is anatomically admirably arranged to resist infection.

That it is continually exposed to the action of pathogenic germs.

That when we have an inflammation of the tonsil it is caused by a pathogenic germ which is endeavoring to enter, and the inflammation itself is essentially a defensive reaction.

That when the resistance of the body is lowered from any cause, or the germs are virulent enough to overcome the other means of defense, which the tonsil has in common with the rest of the oral mucous membranes, or if the

(1) Medical Record, March 2, 1907.

tonsil is wounded, a positive chemotaxis having been produced, there is a lacunar tonsillitis.

That when a negative chemotaxis is produced, either on account of the virulence of the infection or from some other unknown cause, there is a general systemic infection without a tonsillitis.

That when we do have a systemic infection it is either in spite of the defensive reaction or on account of negative chemotaxis.

That finally the relation of the tonsil to infection and infectious diseases is one of protection, and the disease we call lacunar tonsillitis is an example of phagocytosis and is a defensive reaction.

[That the tonsils under ordinary circumstances have great power to resist infection is undoubtedly true, but the reason for the indictment against these organs is that *they constantly harbor pathogenic organisms* which they are able to keep from entering the system only when all conditions are favorable, while if the general resisting power of the system be lowered, or if any local temporary weakness obtains from any cause, the bacteria enter the tissues and disease results. Apparently the tonsils protect against no danger except that which they constantly hold in their own crypts and even this they are constantly failing to do.—Ed.]

Tuberculosis. G. B. Wood[1] continues his investigations in regard to the possibility of infection through the tonsils. He gives details of an experiment in which the tonsillar lymph glands were removed from a pig three days after the pig's tonsils had been rubbed over with virulent tubercle bacilli and an emulsion of the glands injected into guinea-pigs. The experiment seemed to demonstrate the ability of the tubercle bacilli to pass through the tonsils and infect the system without producing any apparent lesion of the tonsils.

He gives the history of a case in which the primary infection was apparently in the tonsils.

In 232 cases, taken without regard to symptoms, on which he had operated, C. M. Robertson[2] found 8 per cent.

(1) Laryngoscope, May, 1906.
(2) Jour. Amer. Med. Assoc., Nov. 24, 1906.

of the tonsils showing undoubted tuberculous lesions. He believes the tonsils are often the direct means of infection of the lungs. He has never found the tuberculous changes in the surface membrane but always in the crypts. The crypts most constant in the production of infection are those whose entrance is from the superior part of the gland. There are three or four which are constant enough to be classed as *the infecting crypts of the tonsil.* They are: One which empties just behind the anterior pillar near its margin, one just below the junction of the anterior and posterior pillars, one just in front of the posterior pillar on the top of the tonsil and one about the middle of the top of the tonsil all in the supra-tonsillar space. The reason of this is the obstruction to the opening of these crypts. The crypts in the lower part of the tonsil discharge their contents readily and are rarely ever the points of entrance for infection. He believes that the removal of such tonsils will often be followed by the disappearance of enlarged tuberculous glands in the neck. In discussing Robertson's paper J. L. Goodale stated he did not believe that a cervical adenitis of tuberculous nature can be removed by removal of the tonsils; the tubercle bacilli have already penetrated into the lymph glands. What should be done under these circumstances is the prevention of further penetration of more bacilli into the cervical lymph glands by extirpation of the tonsils and adenoid, but if they are already enlarged that will not necessarily alter the course of these glands. In many instances there is enlargement of the glands of a non-tuberculous nature in which removal of the tonsil brings relief to the glands. Dr. Goodale had a series of such cases of cervical adenitis in which the tonsils were removed, with disappearance of the adenitis, and in no instance did infection of the guinea-pig follow inoculation with the tonsil. Summing up, Dr. Goodale said that the more he finds enlargement of the tonsil with cheesy detritus associated with cervical adenitis, the more he is inclined to regard the adenitis of toxic origin by absorption from the tonsils; while the less he finds of pathologic alteration in the tonsils, the more he is inclined to regard it as of tuberculous origin.

Hyperkeratosis. G. B. Wood[1] believes this disease is due not to the leptothrix as usually stated but to an exaggerated functional activity of the surface epithelium of the crypts. The disease usually appears at the time of life when there is more or less active atrophy of the tonsillar tissues. Wood thinks this cessation of functional activity of the parenchymatous epithelium—the epithelium dipping into the parenchyma—permits of a more active process in the surface epithelium: "When the physiologic activity of the epithelium has ceased the epithelial cells revert to their original type and form an intact squamous pavement epithelium. The extravasation of leucocytes and fluids through this intact epithelium is rather difficult, and the growing superficial cells can accumulate in the crypt until a greater or smaller mass of keratoid material is formed."

Of treatment he says the theory advanced would indicate the uselessness of any local treatment other than the destruction of the tonsillar crypt and that clinical experience bears out this view. Almost all the cases tend to recover spontaneously after a period varying from a few months to a year or more.

He insists: "It would be as rational to hold the grime and dirt of a miner's hand responsible for the horny layer of the skin as it would be to believe that the saprophytic leptothrix is the causative element in the production of what is really a calloused tonsil."

F. J. Quinlan[2] states that the general consensus of opinion as gathered from the literature is that leptothrix buccalis is the chief etiologic factor in pharyngomycosis. Siebenmann believes the disease is essentially a cornification of the lacunar epithelium. This is also the view of Simonescu, as also that of G. B. Wood, previously quoted.

Any part of the upper respiratory tract may be the seat of the disease, from the nasopharynx to the larynx below the cords, but the most usual sites of the disease are the faucial and lingual tonsils.

The symptoms of the disease are slight, discovery of its presence usually being accidental. Only in the severer forms does the act of swallowing become painful, and in

(1) Annals of Otol., Rhinol. and Laryngol., December, 1906.
(2) Laryngoscope, February, 1907.

such cases the cervical lymph glands may become enlarged and there may be a slight rise of temperature.

The treatment recommended varies from mild antiseptic washes to the galvano-cautery or excision. In the cases where there are no symptoms no treatment is necessary unless for the peace of mind of the patient. Perhaps the most usually recommended treatment is the removal of the plugs from the lacunæ by the curette and the application of a solution of chlorid of zinc, 1-50, or tincture of iodin, 20 per cent. chromic acid or other similar mild cauterants.

In discussing Quinlan's paper (Laryngological Section, New York Academy of Medicine) several of the speakers stated they had found all methods of treatment unsatisfactory while the patient remained in the city, but if he were given any simple antiseptic gargle and sent to the country for two or three weeks the disease promptly cleared up.

Tonsillectomy. In a discussion[1] on the subject of removal of the tonsils which took place in the Laryngological Section of the New York Academy of Medicine the usual diversity of opinion was manifested.

H. P. Mosely presented a new snare and advocated its use in tonsillectomy. He spoke of the impossibility of removal of the entire tonsil in the ordinary case by means of the tonsillotome and the necessity for finishing the operation thus begun with the tonsil punch. Delavan justified the use of the snare in proper cases, which he described as those in which the tonsil is projecting, its base fairly limited and definite, the tonsil of fibrous character and the patient under ether; also where the tonsils are of unusually large size. He makes special mention of the fact that the wound is of smaller size when the snare is used than when the tonsillotome is used; the stage of healing being consequently much shorter with the snare. He said he had frequently proved this by removing one tonsil by the snare and the other by the tonsillotome in the same throat at one sitting.

Most of the speakers alluded to the greater pain in the use of the snare as compared with cutting instruments. T. W. Corwin gives chlorid of calcium to all his cases for four or five days preceding removal of the tonsil in order

(1) Laryngoscope, December, 1906.

to obviate the danger of secondary hemorrhage. He uses the galvanocautery to make section of the mucous membrane surrounding the base of the tonsil in order to lessen the hemorrhage. In adults he uses a mixture of equal parts of cocain, carbolic acid and menthol swabbed around the base of the tonsil to relieve the pain. Simpson prefers the tonsillotome and thinks it usually impossible to remove the entire tonsil with either the snare or tonsillotome. Coffin seldom uses the snare, on account of the pain.

[The Editor wishes to call attention to the method of control of immediate hemorrhage in tonsillectomy. The methods usually advised—local application of astringents, adrenalin, pressure, etc.—are not the ones used in other surgical work generally. In other localities the bleeding point is found and an artery forceps applied. This method is just as useful in most cases of tonsillar hemorrhage as in other localities. If the hemorrhage is due to a general oozing from the cut surface astringents will control it readily. If in spite of such applications the bleeding continues, the proper thing to do is to clear away the clots and look for the bleeding point and apply snap forceps to it. The pressure and slight torsion will almost certainly check the flow of blood. For removal of the small and buried tonsils the Editor desires to recommend again Hank's trachelloraphy scissors. The tonsils are loosened from the pillars by any of the usual methods and then while drawn upon strongly with forceps are quickly dissected out with the scissors. They are made in rights and lefts and should be carefully selected. The well-made ones are good instruments; the lighter ones found in many shops are absolutely useless for tonsil work; they will not cut.]

As previously mentioned, H. P. Moseley[1] believes the cold wire snare is the most satisfactory instrument for the removal of the tonsils. When the tonsil is flat, spread out and, receding behind the faucial pillar, the cold wire snare will get it out and get it out completely. The wire follows the line of least resistance as it is drawn into the snare, so that, when the end of the instrument is held firmly in the supratonsillar fossa, the steel wire through its natural resiliency buries itself firmly around the base of the tonsil

(1) N. Y. Med. Journal, Nov. 6, 1906.

and the whole mass is removed. He usually employs No. 8 steel piano wire and a specially constructed powerful snare.

THE PHARYNX.

A method by which the esophageal wall of the larynx may be readily inspected is described by C. von Eicken.[1]

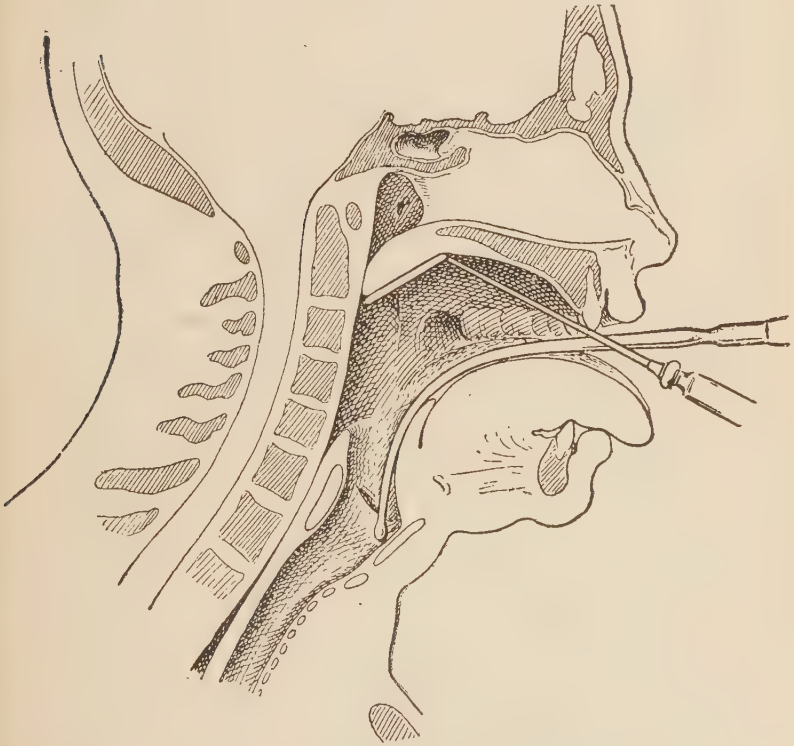


Fig. 34. Hypopharyngoscopy.

The illustrations, Figs. 34 and 35, depict the method very clearly. Cocain is used in the larynx in order to render the use of the bent sound painless. The procedure has proved of value in certain cases in which the symptoms rendered

(1) Archiv f. Laryngol. und Rhinol., B. 19, H. 2.

an inspection of the hypopharynx desirable. The author describes a case in a woman of 31 in which dysphagia had existed for 10 weeks without any lesion being discovered. By hypopharyngoscopy, as he calls the method, a large ulcer was discovered on the pharyngeal surface of the posterior laryngeal wall.

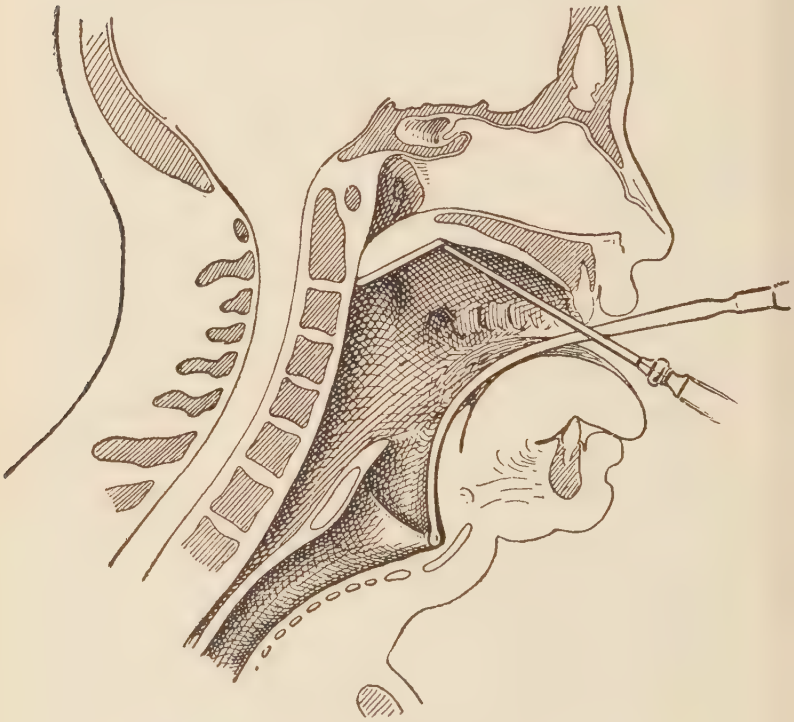


Fig. 35. Hypopharyngoscopy.

Pharyngitis Lateralis. W. Uffenorde[1] calls attention to the frequency and importance of pharyngitis lateralis, which has, however, received comparatively little notice in the textbooks, it being usually not mentioned at all or merely included as a part of the subject of chronic pharyngitis. The affection consists in an inflammation of the

(1) Archiv f. Laryngol. u. Rhinol., B. 19, H. 1.

lateral tracts of the pharynx, which consist of lymphoid tissue similar to the tonsil and run from the neighborhood of the eustachian tube behind the pillars of the fauces to the pharyngo-laryngeal region. This tissue is thickest in the oral part of the pharynx and narrows somewhat above and below. The disease may exist as an acute affection, but is usually chronic. It may appear in two forms as a hypertrophic diffuse affection and a granular form affecting the follicles.

The causes are somewhat various. The constitutional affections that favor the occurrence of chronic pharyngitis are active here. Smoking or chewing tobacco, the use of highly seasoned food, the inhalation of irritating dust and other sources of local irritation are causes. It is often due to catarrh of the nose, suppuration of the accessory cavities, especially in sphenoid cells, and repeated coryza from cold.

The symptoms consist in pain varying from slight discomfort to marked pain on swallowing, tickling in the throat sometimes leading the patient to suppose that a fish bone or some other particle of food is lodged there. The sensation of a foreign body may take the form of globus hystericus.

Affections of the ear, such as pain, temporary deafness, ringing in the ears, nervous symptoms referable to the ear, etc., may occur. Cough may be a prominent symptom. The larynx may be affected. Uffenorde regards the syndrome described by Boenninghaus as a consequence of pharyngitis lateralis. It is quite certain that disease of the upper part of the pharynx may cause pain in the region of the larynx.

The diagnosis of this affection is easily established by discovering the swollen lateral tract, but it must be noted that somewhat insignificant lesions in this region are capable of giving rise to serious complaints.

The diagnosis should include the discovery of complications and of primary affections of the upper air passages, especially of the accessory cavities, upon which the pharyngitis may depend.

Treatment should include preliminary gargling with solution of aluminum acetate or touching the nasopharynx with a 2 per cent. solution of chlorid of zinc. If the lesions

are pronounced they should be cauterized with trichloracetic acid, a small piece of cotton being saturated with the acid and applied to the part. The cauterization is repeated once a week. If this is insufficient removal of the lateral tract with Halle's scissors or Hartmann's conchotome is effective. The galvanocautery is uncertain and difficult to control and has produced fatal caries of the vertebræ.

Laryngotomy in Pharyngeal and Nasal Operations. In all operations in the pharynx or nasopharynx in which a general anesthetic is necessary the danger of inspiring the blood is great and the necessity for constant sponging and stopping the operation to permit of the administration of more anesthetic so prolong the operation that such operations are peculiarly dangerous and much dreaded by surgeons. Tracheotomy is often done so that the larynx may be plugged and the operation be much shortened, but the tracheotomy adds a decided element of danger.

J. W. Bond[1] believes that such operations are much simplified and the dangers of tracheotomy avoided by doing a laryngotomy as a preliminary step in all serious operations on the nose or throat under a general anesthetic. He says he has followed this procedure for fifteen years and finds that it (1) makes such operations less dangerous to life; (2) increases the number of cases which can be operated upon owing to the diminished danger; (3) helps surgically in the operation by getting rid of the respiration through the pharynx during the time of operation, and of the hindrance caused by perpetual sponging and coughing; (4) gives the chloroformist a clear field for his work away from the site of operation, so that he may do his work uninterruptedly without taking turns about with the surgeon; (5) lessens the time needed to perform certain operations attended by bleeding difficult to control; (6) gets rid of tracheotomy as a preliminary operation in all suitable cases, and so again assists in making the operations in question more easy, quick and efficient in saving life.

With regard to tracheotomy—high or low—he says all who have seen much of it in hospitals must agree that it is often difficult to perform, that whether done hurriedly or slowly it is apt to be associated with the suction of blood

(1) British Med. Journal, Jan. 5, 1907.

into the trachea and lungs, and that the deep tissue of the neck is opened up in the operation, so that tracheotomy as a preliminary operation intended to facilitate the operation required may unhappily increase danger and even be the cause of death.

Laryngotomy, on the other hand, as a preliminary operation can be done in a few seconds without any hemorrhage of consequence, and with but slight opening up of the neck tissues. The wound can be healed in a few hours, and the whole operation is without danger and easy to perform. In most cases the method of operating is as follows:

First, an assistant lifts up a vertical fold of skin, the center of which should be at the level of the upper border of the cricoid cartilage when the head is extended.

Secondly, the center of the uplifted fold is transfixed and cut through so as to make a transverse cut of 1 inch in length. It will be found that the veins running vertically in this region have not been cut, and are exposed at the bottom of the wound.

Thirdly, a pair of sharp closed scissors curved on the flat are plunged through the crico-thyroid membrane downwards and backwards in the mid-line, keeping close to the upper border of the cricoid, so as to avoid the little artery. The scissors are then widely opened.

Fourthly, the laryngotomy tube is inserted between the blades of the widely-opened scissors, or retractors can be used after withdrawing the scissors. In most cases it is quite easy to pass the tube with the left forefinger nail serving as a guide above, whilst an assistant holds the partly-opened scissors in position. The laryngotomy tube should be a little flatter than a tracheotomy tube; it should be fitted with a pilot with not too blunt a point, and the tube should project beyond the plate externally, so that the chloroformist can easily fix an india rubber tube through which to give the anesthetic. If need be, a small or medium Durham's tracheotomy tube will serve every purpose.

Lastly, the pharynx can be firmly packed with a large flat sponge, a series of which should be in readiness,

and the preliminary operation preparations for some graver matter are therewith ended.

In a few cases where it is necessary to have more room in the middle pharynx, the plugging can be modified by plugging the top of the larynx. The eyed end of a long bent probe can be passed up through the wound into the mouth, and one end of a tape, to the middle of which a small sponge has been fixed, threaded through the eye of the probe and pulled down through the wound. The sponge can then be pulled down and firmly fixed into the top of the larynx by tying the lower end of the tape to the upper end, which has been carried through the mouth.

On Bond's recommendation H. T. Butlin[1] began using this method, and after practicing it in more than 100 cases he can speak only in highest praise of it.

Cancer. Scanes Spicer[2] reports a case of inoperable cancer of the fauces, the pharynx, the tongue and the cervical glands that showed marked improvement after treatment for ten weeks with a bacterial vaccine of *Micrococcus neoformans.* The patient was a man of 75. The tumor blocked the faucial isthmus sufficiently to prevent laryngoscopy and prevented extrusion of the tongue. The surface of the growth was studded with bloated fungous granulations imbedded in copious brownish yellow fetid fluid on an ulcerated purplish base. The patient had lost much weight. Iodid of potassium in 15-grain dose t.i.d. was given for a week without improvement. A piece of the growth removed from the tonsillar area was pronounced to be a spheroidal-celled carcinoma.

The treatment by bacterial vaccine was carried out by A. E. Wright. The favorable changes commenced at once and the patient continued to improve for five or six weeks, after which there was no further improvement, but no regression. The changes observed were: (1) Diminution in the size of the faucial mass, so that laryngoscopy became possible; (2) lessening of the ulcerated surface and the unhealed parts looked like a healthy granulating surface; (3) disappearance of the bloated granulations; (4) loss of fetor; (5) disappearance of dysphagia and pain in the

(1) British Med. Journal, Jan. 5, 1907.
(2) Jour. Laryngol., Rhinol., Otol., June, 1906.

throat; (6) the tongue became less rigid; (7) the external mass shrunk down enormously, leaving one small hard gland. No other treatment was used. Whenever the opsonic power was low the patient invariably complained more of head symptoms. No opinion was tendered as to whether the treatment had influenced only secondary ulcerative and septic processes, or the malignant substratum itself, nor did it seem determinable what were the proportions which these factors bore in the sum-total locally. The whole improvement was nevertheless marvelous, both locally and in the patient's general condition, and the case was a good augury for the influence of the method. A cure was not claimed, and the patient was shown as still under treatment in case unfavorable changes should supervene before next session.

Professor Wright, in explaining the treatment, stated that Doyen had asserted that there could be obtained by cultures from all, or practically all, new growths—whether of a malignant or a non-malignant nature—cultures of a characteristic microbe. This microbe was, by Doyen, regarded as the specific cause of cancer, on the ground that it produced in his hands when inoculated into rats neoplastic lesions. It was accordingly named by Doyen the *Micrococcus neoformans.*

Wright gives the methods of differentiating the *Micrococcus neoformans* from the staphylococcus, which it resembles, and states that a scientific basis for the differential diagnosis of the *Micrococcus neoformans* having thus been obtained, and having verified by these means that a culture of the *Micrococcus neoformans* supplied by a Belgian observer (Geets) correspond in all respects with two cultures obtained elsewhere, he had recently begun the task of investigating the opsonic and agglutinating power of the victims of malignant disease with respect to the *Micrococcus neoformans.* With respect to the agglutinating and opsonic powers of the victims of malignant disease these differ from the normal (1) in the fact that they are lower and in others much higher; (2) in the fact that the opsonic index is in some cases constantly fluctuating, as it does in cases of bacterial infection, which are associated with constitutional disturbance; (3) and in the fact that phagocytosis is in some cases obtained with the serum

after it has been heated to 60° C. for ten minutes. He concludes there is ground for the belief that infection by the *Micrococcus neoformans* is one of the factors which must be reckoned with in connection with malignant disease. He states that the case exhibited is the only one of five treated in this manner which has shown a striking result. Of the other four cases two have already died. Of the two others one appears to be quite stationary, while the other shows marked signs of improvement.

Spicer's patient was again shown before the London Laryngological Society five months later, after having undergone a further twenty weeks' treatment with the vaccine. He had gained two pounds. The malignant growth had receded in one part but was more prominent in another.

Spicer concludes there is sufficient proof of the influence of the injections in the fact that though it was eight months since the man came under observation he was still comparatively well and had actually gained weight.

Adenosarcoma. In a case of adenosarcoma of the tonsillar ring in a woman 53 years old W. R. Dabney[1] resected both external carotids. The growth, involving faucial, pharyngeal and lingual tonsils, interfered greatly with breathing and swallowing and the operation was done simply as a palliative in preference to tracheotomy, gastrostomy or rectal feeding. Six months later the faucial and lingual growths were only about one-fifth their former size and the patient was again able to enjoy life. The growth occupying the region of the pharyngeal tonsil had not diminished so much in size, explained by some anatomists as due to the pharyngeal tonsil receiving a part of its blood supply from the internal carotids.

THE LARYNX.

Disturbances of Sensibility in the Larynx. The origin of the sensory nerve of the larynx is not yet settled, according to G. Avellis.[2] A unilateral anesthesia of the larynx is a phenomenon of great rarity and interests the neurologist more than the laryngologist. Two questions with

(1) Laryngoscope, May, 1906.
(2) Archiv f. Laryng. u. Rhinol., B. 18, H. 3.

regard to the distribution of the sensory fibers in the larynx are unsettled: First, to what extent one of the superior laryngeal nerves provides sensibility for the opposite side, and, second, to what extent the recurrens participates in the sensory innervation. The author reports a clinical observation of unilateral anesthesia of the larynx combined with paralysis of the recurrens. In this case there was a cerebral anesthesia with a peripheral paralysis. Hypesthesia of the whole glottis was present. The unilateral anesthesia disappeared under suggestion but the general hypesthesia persisted. From the facts in this case he concludes, first, that the combination of paralysis of the recurrens and unilateral anesthesia of the larynx was accidental and had no common organic basis; second, the paralysis of the recurrens was permanently associated with a hypesthesia of the entire glottis so that only exceptionally would touching the paralyzed side with the sound bring about a reflex contraction of the other side. The author has carefully observed all of the cases of paralysis of the recurrens occurring in his practice for the combination with paralysis of the soft palate and also with exception of a few very irritable patients for the relations of sensibility. He has come to no certain conclusions, but in consequence of the publication of Massei he feels that these questions should receive further discussion. Massei observed anesthesia as an almost constant accompaniment of paralysis of the recurrens, and it was possible to establish its presence before the paralysis, and it never reached below the vestibule. In paralysis of the left recurrens there occurred almost complete anesthesia; with the right, hypesthesia. The anesthesia was always general, not unilateral. The observations of Avellis confirm these statements except that the anesthesia has not been complete. Observations upon neuralgia and in local anesthesia indicate that the assumption that each side of the larynx receives sensory innervation exclusively from the nerve of that side must be given up as erroneous. In conclusion he enumerates the following questions as still awaiting solution:

1. What part has each superior laryngeal in the sensory innervation of the opposite side?

2. What relative per cent. of degenerated fibers is

found on the other side in unilateral destruction of the superior laryngeal?

3. What part has the left and what the right recurrent in the sensory innervation of the entrance of the larynx?

4. Is hypesthesia also recognizable in paralyses of the recurrens which do not show the syndrome of Avellis (Coincident paralysis of the velum palati)?

5. What is the behavior of the sensory disturbances in bilateral paralysis of the recurrens?

6. Can the observations of Frey and Avellis that the sensory innervation of the subglottic space is referable to the inferior laryngeal nerve be confirmed by others?

7. How can the last proposition (No. 6) be reconciled with Massei's investigation in which in paralysis of the recurrens it was precisely the vestibule of the larynx that was found to be hypesthetic or anesthetic?

In Avellis' opinion one proposition only is at present established, viz.: *Hemianesthesia in the larynx occurs only in hysteria.* Other nerve lesions in the superior or inferior laryngeal may excite disturbances of sensibility but no unilateral anesthesia.

Paralysis of the Recurrent Nerve. A. Kuttner [1] reviews some of the unsettled questions with regard to the phenomena occurring in consequence of paralysis of the recurrent laryngeal nerve and remarks that the last decennium has witnessed important advances in our knowledge regarding these questions. These he sums up as follows:

1. We have at present a more accurate knowledge of the difference between the real position in the cadaver and the so-called cadaver position in paralysis of the recurrens.

2. We understand better the innervation of the laryngeal muscles during respiration. We now know that in quiet as well as in excited breathing not only the posticus, as was formerly assumed, but all the laryngeal muscles, both those which close the glottis as well as those that open it, are simultaneously and continuously innervated.

3. The removal of the posticus in the adult animal does not lead, as was formerly assumed, to a permanent medial position of the vocal cords. The in and out movement of

(1) Archiv f. Laryngol. u. Rhinol., B. 18, H. 1.

the vocal cords is retained, as has been shown by several authors. The only difference shown by vocal cords deprived of the posticus is that the outward movement on the injured side is somewhat less than on the uninjured.

4. This outward movement cannot be of a passive nature, as Grossman has claimed, caused by the suspension of innervation of the adductors during inspiration. If this assumption were correct the vocal cord deprived of the posticus could never be abducted beyond the position of equilibrium which it assumes after section of the laryngeal nerve, but researches have shown that after removal of the posticus the affected cord can be brought by active movement far beyond this position of equilibrium. This observation has been confirmed by various authors; but the question which muscles are active in abduction after the removal of the posticus is not yet decided.

5. The changes after the section of the recurrent in muscle and nerve have been not fully explained, but our understanding of them has been considerably advanced.

6. O. Frese has shown that the recurrent reacts to powerful chemical irritants in a manner entirely corresponding to the way in which it reacts to the action of cold. Kuttner discusses the investigations of Broeckaert, who is inclined to deny the validity of Semon's law, namely, that after section of the recurrent nerve the muscles which open the glottis are earlier affected in their functions and to a greater degree than those which close it. Broeckert admits the validity of this law for affections of the center of origin of the recurrent, but thinks it is not applicable to cases in which the trunk of the nerve is affected, although in these cases the same laryngeal picture is exhibited. Broeckaert explains the median position by assuming that the muscles closing the glottis are naturally more powerful than their opponents, so that while they are equally injured by section or injury to the trunk of the nerve the remnant of power is greater in the closing than in the opening muscle.

In support of his theory Broeckaert reviews physiology, pathology and clinical cases, which J. Kuttner also reviews and criticises. The conclusion of the latter author is that there is as yet no sufficient explanation of the median position as to whether it is to be attributed to a greater

vulnerability of the abductors of the glottis dependent on peculiar biochemical relations in the nerve supply of these muscles or on an especially numerical relation. The results of physiologic and pathologic as well as clinical investigation, however, support the validity of Semon's law not only in progressive affections of the center of origin of the recurrent but also in similar affections of the nerve trunk.

In a later communication Kuttner[1] refers to the criticisms of Grabower and makes a brief answer to them. The first objection is that Kuttner has disregarded the mixed character of the recurrent nerve. In reference to this he shows that sensory fibers in the recurrens are found only in certain animals and therefore it is not certain that it is a mixed nerve in man, although the observations of F. Massei[2] indicate that disturbances of sensibility of the larynx are always associated with paralysis of the recurrent. The claim of Onodi that the sympathetic participates in the innervation of the laryngeal muscles has been shown to be erroneous. The temporary activity of the cricothyroid to which Grabower refers is admitted, but has nothing to do with the permanent median position assumed by the local cords.

Grabower[2] discusses the subject of paralysis of the recurrent and agrees with Kuttner that the experiments of Broeckaert have not invalidated Semon's law. He calls attention, however, to the fact that Broeckaert's theory has some justification in the fact that injuries to the trunk of the nerve, whether of central or peripheral origin, affect the nerve elements of both groups of muscles, the abductors and the adductors, but the effect of the injury, the paralysis, reaches its expression sooner in the posticus than in the adductors. This is shown by some clinical observations as well as experimental, which show that soon after an injury to the nerve the vocal cord takes the median position in consequence of the action of the adductor muscles, but subsequently assumes the position known as the cadaveric. The reason for the early paralysis of the posticus is not to be found, as Broeckaert thinks in the size

(1) Archiv. f. Laryngol. u. Rhinol., B. 19, H. 1.
(2) Archiv Ital. di. Laryng., January, 1906.
(3) Archiv f. Laryngol. u. Rhinol., B. 18, H. 3.

of the muscle, but is a purely nervous phenomenon. One important point of more than laryngologic interest is shown by Broeckaert's histologic examinations, and that is that it is possible for a muscle deprived of its motor nerve to continue for months (as many as six) without degeneration. Grabower believes that the reason for the earlier paralysis of the posticus is that it is not supplied with as many nerve elements as the other laryngeal muscles. The author believes that this relation between the innervation of adductors and abductors is not peculiar to the larynx, but is the expression of a general law that is valid throughout the entire organism. In conclusion the author enumerates the subjects to which subsequent investigations should be directed, as follows: First, the investigation of the sympathetic nerve and the vessels; second, all the nerve fibers distributed to the individual muscles; third, investigation of the sensory nerves; fourth, an investigation of the vagus below the point of separation of the recurrens; fifth, examination of all the laryngeal muscles in their various parts by serial sections. In this way the undecided questions may be elucidated. Saundby's case, in which an injury to the recurrens resulted in a preponderating action of the abductors, appears to Kuttner to nullify the theory of Broeckaert, for in this case there appears to have been an equal reduction of the energy of the two sets of muscles, and yet the group which is presumably the stronger—that is, the adductors—showed the greater defect. Kuttner regards Grabower's conclusion that the posticus fails the sooner because it has the poorer nerve supply as unjustified.

Diriart[1] and Rozier[2] report a case of paralysis of the recurrent caused by a goitrous tumor, probably of sarcomatous origin, which developed quite suddenly in the sulcus between the trachea and esophagus on the left side. The fact that the left recurrent nerve is poorly protected by the trachea favored the lesion in this case. Pressure by an enlarged thyroid may be placed second among the causes of paralysis of the recurrent, aneurism of the aorta being first.

The case was relieved by removal of the tumor, which

(1) Ann. des Mal. de l'Orielle, du Lar., du Nez et du Phar., September, 1906.

was fortunately undertaken at an early stage of the disease.

Neuritis of the Inferior Laryngeal Nerve. G. Boeninghaus observed about seven years ago a symptom complex consisting of pain in the pharynx accompanied by special tender points in the larynx, which he refers to as neuritis of the inferior laryngeal nerve. This affection is described in the Practical Medicine Series, 1905, Vol. III, p. 284. Since the communication has received comparatively little recognition, the author believes it desirable to bring it again to the notice of the profession. He now details[1] the history of 82 cases, from which he constructs the clinical picture. The ages of the patients varied from 17 to 70, the greatest number, 48, falling between the twentieth and fortieth year. The greater number of patients were women, but the author thinks this is due to the preponderance of female patients in his clinic. Its occurrence is limited to no class or occupation. The influence of season cannot be determined.

In the majority of cases the pharyngeal pain occurred in the course of a chronic laryngitis. The laryngitis is frequently complicated by pharyngitis and nasal stenosis. In many cases the affection accompanied an exacerbation of the chronic disease. In all but three cases the neuritis was evidently secondary. In only one case was this disease symptom found with laryngeal tuberculosis. Hysteria, diabetes, tabes were sought for but not found. The disease had lasted less than a year in 58 cases, longer than a year in 18, and in most cases for more than a month. The shortest duration was one day, the longest eight years. The course was somewhat irregular, depending upon the improvement or exacerbation of the causative throat affection. Spontaneous recovery may occur and relapses are not so very rare. The most important symptom is pain. This may vary considerably from a light pressure pain or burning, sometimes resembling a foreign body in the throat, to severe pain. In most cases the pain is always present, but is more marked in the daytime, although it may be felt at night and may considerably disturb the rest. Sometimes the entire throat appears to be the seat

(1) Archiv f. Laryngol. u. Rhinol., B. 18, H. 2.

of the pain; sometimes only the upper or lower portion or the right or left side, but rarely a definite point. The pain may radiate to the ear, the chest or the stomach. Diagnosis is established by finding tenderness in typical points. These are: (1) Between the greater cornu of the hyoid and the upper border of the thyroid cartilage, in the lateral part of the thyrohyoid membrane—the upper pressure point; (2) on the side of the main bronchi—the under pressure point. The treatment consists in careful massage of the neck, as described in a previous communication. The article concludes by references to the literature in which a similar symptoms complex has been noted.

Paralysis of the Cricothyroid Muscle. M. Mygind[1] believes that from the literature and from four cases of paralysis of the cricothyroid muscle which he has had opportunity to observe we are in a position to define the clinical picture which results from this lesion. The disease is a rare affection, as shown by the fact that only a small number of cases have been observed. The fact, however, that he has had opportunity to see four such cases in four years would seem to indicate that possibly the affection does not occur so rarely as has been generally believed. It is possible also that the failure to record cases has arisen partly from the imperfect knowledge of the laryngoscopic picture and partly from the difficulties associated with the observation of the details of this picture.

Etiology. The cause was unknown in three cases and in four a bulbar disease of unknown origin was assigned as the cause. In three the disease depended on a traumatic affection of the laryngeal nerve and in one on a lesion of this nerve in consequence of inflamed cervical glands. In four cases diphtheria and in two overuse of the voice are given as causes. From this it is evident that paralysis of the cricothyroid muscle in the majority of cases depends on a lesion of the laryngeal nerve, and only exceptionally is of a purely muscular nature. Most of the patients were men past middle age.

Symptomatology. Hoarseness is not a necessary symptom. Lessened ability to produce high tones is generally present and a monotonous voice consequently results. The

(1) Archiv f. Laryngol. u. Rhinol., B. 18, H. 3.

observations of the author have shown a rapidly occurring exhaustion upon intonation. Objective examination shows that the imperfect contraction of the muscles can be recognized by external palpation, and it has been claimed that in this way it can be shown that the distance between the thyroid and cricoid cartilage is not lessened on intonation. The author doubts the possibility of distinguishing this condition. By laryngoscopy the following signs are found: First, always in unilateral paralysis of the cricothyroid muscle and often with bilateral paralysis if the disease has not the same intensity on both sides. The glottis lies obliquely in the horizontal plane, so that the anterior end is turned to the right if the right muscle only is paralyzed; or, most markedly, if the left muscle is most affected, the anterior end of the glottis is turned to the left. Second, in bilateral cricothyroid paralysis the glottis appears on intonation as an irregular wave-like line. Third, the upper surface of the paralyzed vocal cord shows numerous irregular depressions and folds. Fourth, this appearance is more marked upon intonation, because the paralyzed vocal cord is then expanded by the expiratory air. Lastly, it must be noted that in most cases of paralysis of the cricothyroid muscle a reduction or disappearance of the reflex irritability of the laryngeal mucous membrane can be demonstrated.

Subglottic Larnygoscopy. In ordinary laryngoscopy the posterior surface of the epiglottis, the posterior wall of the larynx and the under surface of the cords are not seen. Cases sometimes present in which inspection of these parts is very desirable. Gerber[1] describes a method by which this result may be attained.

A man of 55 was referred to the author to learn if possible the source of a moderate but persistent hemorrhage which stained the previously clear mucous sputum.

No bleeding spot could be detected, but the blood first appeared just above the edge of the right vocal cord.

Fig. 34 depicts the method by which Gerber and Magnus secured a view of the under surface of the cord and discovered a varicosity which was the undoubted source of the bleeding.

(1) Archiv f. Laryngologie u. Rhinologie, B. 18, H. 2.

The subglottic mirror is oval, 4/10 inch long by 1/3 inch wide, attached to a shank bent downward for $3\frac{1}{2}$ inches. The larynx, and especially the vocal cords, are given an application of strong cocain solution.

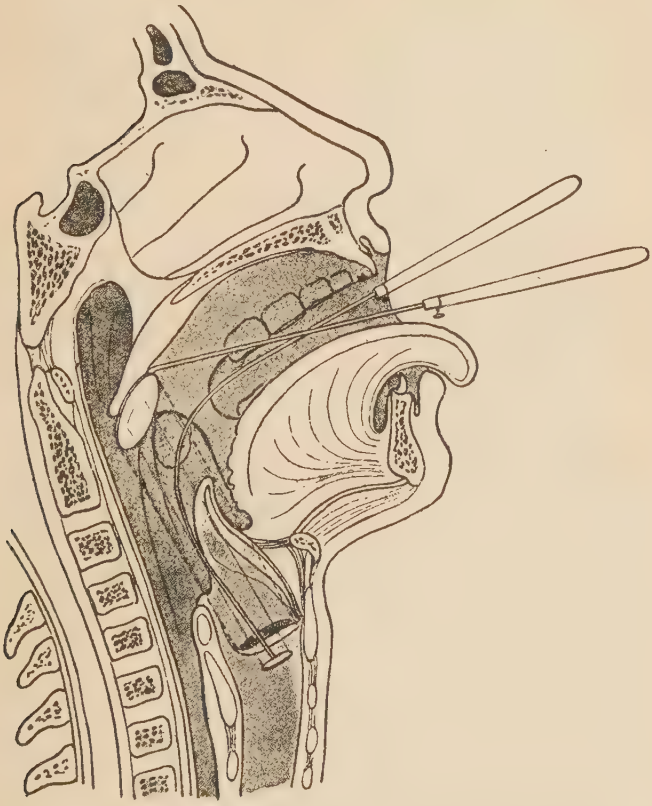


Fig. 36. Subglottic laryngoscopy (Gerber).

Congenital Laryngeal Stridor. From his investigation of several of these cases D. R. Paterson[1] arrives at the following conclusions:

1. There is no malformation beyond an exaggeration of

(1) British Med. Journal, Nov. 24, 1906.

the natural incurving of the infantile epiglottis which can be easily unrolled by the probe.

2. There is no evidence of abnormal breathing, as suggested by Thomson and Turner. In deep anesthesia the breathing is regular and the stridor very marked.

3. Stridor takes place at the entrance of the larynx by the vibration of the soft structures on the posterior wall. The vocal cords take no part in its production and compression of the trachea by an enlarged thymus is no essential element.

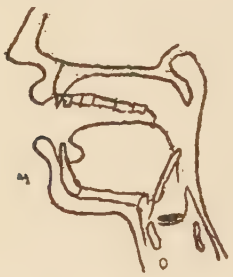


Fig. 37. To show upright position of posterior wall in normal larynx.

Fig. 38. To show folding forwards and downwards of posterior wall in congenital laryngeal stridor.

4. Variation in stridor is often due to the relative position of the tongue. It is also affected by catarrhal states of the respiratory tract, and probably by conditions of the general health.

Fig. 39. Appearance of aperture of larynx during expiration.

Fig. 40. Appearance of aperture during inspiration.

Rheumatic Cricoarytenoid Ankylosis. Ten cases of this condition have been reported in the literature, according to

H. P. Moseley,[1] who gives a synopsis of the reported cases and describes another seen by him. His patient was a physician aged 26. The author gives the following reasons for his diagnosis:

1. Absolute immobility of the joint. In phonation pressure on the normal arytenoid against the affected one does not displace the latter. This it might do if the lesion was a nerve paralysis.

2. The swollen appearance of the joint has remained practically unchanged for months.

3. The normal tense appearance of the cord showing an absence of any local evidence of paralysis.

4. Absence of any evidence of pressure on the recurrent laryngeal nerve.

That the rheumatic element is the causal factor is indicated by (1) a rather marked family history; (2) a personal history of indefinite rheumatic character, with a recent rather sharp attack simulating gout, associated with an acute attack of laryngitis; (3) the complete absence of any other known cause for the condition. It is for these reasons that Mosely thinks the diagnosis of rheumatic cricoarytenoid ankylosis is justified.

Tubercular Laryngitis. The *treatment* of laryngeal tuberculosis by *complete vocal rest* is strongly recommended by F. Semon.[2] He tried this method with patients years ago, but without sufficient results to encourage persistence. He is satisfied that the poor results were due to the practical impossibility of a patient refraining from voice use while at home amid friends. Since the advent of the sanatorium treatment of tuberculosis Semon has again tried the silence treatment and with much more encouraging results.

A patient who has left home to seek health in a sanatorium is usually enough in earnest to try any reasonable method of treatment which offers good prospects. The presence and encouragement of the sanatorium physician is also an effective aid in the patient's determination to refrain from speech.

The author reports in full detail the histories of seven cases in which the silence treatment was quite fully carried

(1) N. Y. Medical Journal, Sept. 15, 1906.
(2) British Med. Journal, Dec. 8, 1906.

out. In every case there was either cure or very great improvement. He does not neglect other treatment, curetting and using lactic acid in ulcerated conditions.

Semon urges that one must not approach the method with exaggerated expectations. It is neither absolutely certain nor indicated in all cases of laryngeal tuberculosis, nor is its exclusive use sufficient in many instances in which it may be advantageously employed. He rather looks upon it as a very valuable helpmate which, although it might in some cases render local treatment superfluous, is not at all intended to altogether do away with the latter. On the contrary, in more severe cases a combination of the two methods will often produce excellent results.

He considers complete vocal rest particularly indicated in cases of inflammatory irritation of the larynx in pulmonary tuberculosis, especially in obstinate catarrh of the larynx, congestion of the vocal cords, relaxation of the ventricular bands, and—in more advanced cases—in circumscribed ulceration of the vocal cords, ulceration in the interarytenoid fold, general infiltration, and in impeded movements of the cricoarytenoid articulation. He does not expect anything of it in those hopeless cases of the last stage in which the whole larynx has become a prey to deep ulceration and partial perichondritis, and admits that in a number of cases in which one might from former experience be entitled to hope that it would prove useful the result is disappointing.

H. Barwell[1] discusses the treatment of laryngeal tuberculosis in so thorough a manner from the radical standpoint that it seems justifiable to give extended extracts from his paper. He says:

"When the disease in the lung is so far advanced or so rapidly progressing that a restoration to some degree of health and comfort cannot be looked for, I hold as strongly as possible that the treatment of the laryngeal affection should be entirely symptomatic; that where there are no severe symptoms it is both useless and cruel to submit the patient to active treatment either with cutting instruments or strong caustic pigments. Such cases make up a large proportion of all the cases of tuberculous laryngitis which come under my care. Nevertheless this is, to my

(1) Lancet, Nov. 10, 1906.

mind, no reason why active treatment should be withheld in all cases. Tuberculous laryngitis often occurs in cases of chronic consumption the subjects of which, but for the laryngeal lesion, have many years of comparative health and comfort before them. In some of these patients complete local cure can be obtained by active treatment; in many others the infiltration cannot be entirely removed and some thickening remains, but even these find a marked improvement of symptoms and the disease at least becomes quiescent for a variable period, which is often of considerable duration. Again, tuberculosis attacks the larynges of patients in a quite early stage of pulmonary tuberculosis much more often than is generally realized. In such cases the lesion is seldom extensive, but consists rather of infiltration or superficial ulceration of one cord or of the interarytenoid space; sometimes, however, massive infiltration is found, and it is then that surgical treatment obtains its most brilliant results. Early diagnosis of the laryngeal disease is of the greatest importance in cases of chronic or incipient pulmonary tuberculosis, and for this reason the routine inspection of the throats of such patients should be strongly urged. From this general introductory statement I will now proceed to detail.

"Tuberculosis begins in the larynx as an infiltration of the submucous tissues which sooner or later tends to break down and form an ulcer; the length of time depends partly on the acuteness of the process but chiefly on the situation of the lesion. Thus on the cords and vocal processes where the subepithelial tissue is very scanty and the parts are subject to attrition ulceration occurs early; on the other hand, at the upper aperture of the larynx, especially on the arytenoids and aryteno epiglottidean folds, a very large amount of tuberculous infiltration may be formed without any ulceration. This, the so-called aryteno-epiglottic type of tuberculous laryngitis, is a formidable form of the disease. It rarely occurs except in severe cases of pulmonary tuberculosis; the lesion lies close to the pharynx, so that the much-dreaded dysphagia is very common, and the actual amount of tuberculous tissue is often very great and, situated beneath unbroken epithelium, is out of reach of treatments by pigments such as lactic acid. Nevertheless, when it occurs in association with the less severe forms of

pulmonary tuberculosis clipping away of the diseased tissue with punch-forceps combined with the use of pigments will often arrest the disease and sometimes result in complete local cure; even in advanced consumptives such treatment relieves the symptoms, especially dysphagia, far more surely than purely palliative measures.

"The other forms of tuberculous laryngitis begin in the interior of the larynx. The disease may affect the cords or the interarytenoid space, more rarely the ventricles, ventricular bands, or subglottic region. Such lesions may cause hoarseness or aphonia, irritation, and rarely dyspnea, but until they reach the upper aperture of the larynx they do not produce severe dysphagia. In all these situations massive infiltration without ulceration is rare; the disease may be very extensive but has usually little mass and depth and, as it can be reached by curette and pigments, cutting forceps are seldom required. A favorite site for deep ulceration is on the inner aspect of the arytenoid cartilage starting from the vocal process; here the soft coverings are very scanty and perichondritis and necrosis of the arytenoid are said to supervene readily. I have watched several cases of such deep ulceration for months, but I have never seen extensive perichondritis follow, and I am inclined to ascribe this to the careful use of strong antiseptic pigments which, when it does not result in healing, at least keeps the ulcer clean and prevents that pyogenic infection to which the perichondritis is ascribed.

"The methods of treatment which have been used are very numerous, but I will only describe such as I myself employ. Antiseptic and caustic pigments are of great value in promoting the healing of ulcers and the shrinkage of granulations, but they have little or no effect on massive infiltration lying beneath unbroken epithelium; they must be applied under guidance with the mirror on a strong cotton-wool mop and must be thoroughly and forcibly rubbed in to the affected parts. The secret of success lies in their proper application and a light painting on of pigments is of little use. Among the many drugs employed in this way lactic acid still holds its place; it must be used in sufficient concentration, and for some time I have employed almost exclusively a mixture introduced by Lake consisting of lactic acid 50 per cent., formalin 7 per cent., and carbolic

acid 10 per cent. This may be diluted to half strength for very irritable patients and before omitting the treatment, when healing is almost complete. The carbolic acid in the mixture acts as a local analgesic and the smarting after application seldom lasts for more than a few minutes; it is usually best to apply the mixture daily, but when this cannot be done less frequent applications, even once a week, have sometimes a good effect.

"The curettes which I employ are of Heryng's pattern; these are very useful for removing granulations and outgrowths in the interarytenoid space, for curetting ulcers there or on the bands or the base of the epiglottis, more rarely on the cords if they prove resistant to the action of pigment—in fact, for all parts of the interior of the larynx. In using the curette an attempt should be made to cut out the outgrowth or base of the ulcer cleanly in one piece. Considerable force is sometimes necessary and a good plan is, after guiding the instrument into position, to remove the mirror and, applying the left hand to the shaft of the instrument, to use it as a fulcrum for the sweep of the curette. Care must be taken when curetting the interarytenoid space lest the swing of the instrument be carried too far and the wall of the pharynx be injured.

"For attacking massive infiltration at the upper aperture of the larynx punch-forceps or double curettes are necessary. For the arytenoid region Lake's punch-forceps are very convenient; they have the right curve, are very strong and remove a good piece at each bite. It is important that the jaws should open as widely as is compatible with a sufficient leverage, for the arytenoid region is often so thickened that it is difficult to get it within the grasp of the forceps. Until lately the only method of excising the entire free portion of the epiglottis was with the galvanocautery snare—a somewhat slow process and decidedly trying to the patient. In 1904 we had made for this purpose a large punch-forceps which removes rapidly and at one bite the whole epiglottis above its attachments. With our pattern, which we call the 'Mount Vernon forceps,' it is best to operate by direct vision after fully depressing the tongue with a spatula, but when the epiglottis is placed very low it is quite possible to guide the instrument with the laryngoscope. After all these operations on the larynx

I apply Lake's mixture to the part, and I repeat the application daily in cases where healing can be hoped for. In cases of very advanced disease, where the operation is only done for the relief of dysphagia, I content myself with the insufflation once or twice a day of orthoform and amyloform in equal parts. These operations can be very rapidly performed and with remarkably little pain or distress even to very feeble patients if the larynx be first carefully anesthetized. No fear need be entertained on the grounds of converting an intact infiltration into an ulcer, for healing occurs with extraordinary rapidity even in cases of advanced disease and septic infection of the wound is, in my experience, almost unknown.

"No local anesthetic is necessary before the application of pigments; the frequent use of cocaine has a most harmful effect on the appetite and the general health. At the most in very irritable cases a little 5 per cent. solution of cocaine to the pharynx may be employed until the patient becomes used to the manipulation. Before surgical operations thorough anesthetisation is necessary. For this purpose I spray a little 10 per cent. cocaine on to the pharynx and then from a curved syringe guided by the mirror I drop a little of the same solution on to the epiglottis and on to the part to be operated on; after an interval of five minutes I repeat this and after a similar interval I perform the operation. In this way the cocaine is only applied where it is wanted and, very little being used, I have never seen bad effects; the method is pleasant to the patient and does not cause coughing or irritation.

"In addition to local methods, general treatment is of the utmost importance and, except when there is acute catarrh of the upper respiratory tract, cases do best under sanatorium *regime*.

"The adoption of local treatment with a view to treating or arresting the disease depends in some degree on the extent and severity of the local lesions, but above all things on the condition and progress of the disease in the lungs. Although, of course, no hard-and-fast line can be drawn, for the sake of clearness I divide the patients into three classes. In the first group come those cases in which the disease in the lungs is in an early stage and is not advancing rapidly and where the general health is good, and

even more advanced cases which show a tendency to improve; in fact, cases in which, as far as the lungs are concerned, the physician would give a comparatively good prognosis. Of those cases one may say that, however extensive the laryngeal disease is, a cure is possible, and that the less disease is apparent in the lungs the bolder and more energetic should our treatment be. Usually in this class of cases the laryngeal affection is not far advanced, but when massive infiltration is present early surgical treatment is indicated. If the disease is inaccessible by the mouth in such early cases of pulmonary tuberculosis I believe that thyrotomy is called for and will give good results, but this operation is quite unsuitable for cases where the lung disease is advanced. In estimating the extent and activity of the disease in the lung the extraordinary way in which the physical signs are masked in many cases of tuberculous laryngitis must be taken into account. Before undertaking serious operations on such cases the patient should be under observation for at least one or two weeks and the temperature and body weight carefully noted and considered.

"The second group comprises the cases where the lung disease is so far advanced that a definite cure cannot be expected, but where the disease is chronic, where there is no rapid loss of weight, hectic fever or great debility. It is in this group that the greatest divergence of opinion as to treatment is found. I myself hold strongly that when the laryngeal lesions are not very extensive indeed active treatment offers a good chance of arrest and even of local cure. There is no doubt that death from pulmonary phthisis is far preferable to the very painful end which results from tuberculous laryngitis. Of course, each case must be judged on its merits as to whether it really falls into this group and the extent and severity of the local lesion must be considered. Thus in a case of chronic but advanced disease, with, for instance, a dry cavity, I am not disposed to curette a small tuberculous infiltration of the interarytenoid space which only causes a little hoarseness and is not likely to spread rapidly. On the other hand, if such a patient has begun to get infiltration of the arytenoid region, which will certainly soon cause dysphagia, or a deep ulcer at the vocal process which will sooner or

later give rise to perichondritis and necrosis, active treatment is indicated. Again, a case of pulmonary tuberculosis, too advanced for cure, may still have many years of usefulness and work before him; an ulcer of a cord may cause aphonia and seriously interfere with work and comfort, and the regular use of pigments, extended perhaps over six or ten weeks, will often heal the ulcer; in less favorable cases it will arrest its progress and greatly improve the voice. In these cases of chronic pulmonary tuberculosis even massive infiltration of the arytenoids and epiglottis can sometimes be healed under surgical treatment.

"Case 1.—The patient, a girl aged 21 years, had had extensive disease of the left upper lobe six years previously, and later involvement of both lungs, but when I saw her in July, 1905, the disease was quiescent and her general health was fairly good. However, she had been hoarse for five weeks and dysphagia had ensued three weeks before I saw her, so that she was then unable to swallow solid food. The epiglottis was much infiltrated and was ulcerated on the under surface, but the rest of the larynx was not infected. I removed the epiglottis in two pieces at an interval of three weeks. The dysphagia was completely relieved from the date of the first operation, and a fortnight after the second operation the wound was healed and no disease was visible in the larynx. The organ is still healthy six months after the operation.

"Case 2.—A young man with extensive pulmonary tuberculosis involving both lungs and a cavity on the right side was admitted to the Mount Vernon Hospital in August, 1905. There was ulceration of both cords with infiltration of both arytenoids. As the lung disease was so extensive and dysphagia was but slight I used no active treatment. However, a week later the dysphagia was much more severe and I clipped away a piece from the left arytenoid, which was the most swollen. The dysphagia was promptly relieved and I noted a fortnight later: 'No dysphagia, left arytenoid swelling shrunken quite so that the corniculum laryngis is visible; right arytenoid much smaller.' Three weeks after this the dysphagia recurred; the right arytenoid swelled and I removed a piece from it, after which there were no symptoms. As the general

health of the patient had improved I used lactic acid daily and by the middle of November there was no arytenoid swelling. The cords were normal, but the ventricular bands were slightly swollen, as also was the left aryepiglottic fold. The patient has since had hemoptysis twice, but has had no more dysphagia. With increasing dysphagia it is unlikely that he would have lived untreated over September and he would have certainly had a painful ending. Such a case is not a cure, but it shows the good effect of surgical treatment in an advanced case.

"Case 3.—A woman, aged 30 years, with fairly early pulmonary tuberculosis, had infiltration of the right arytenoid and slight swelling of the left, with interarytenoid granulations and infiltration of the right cord. On May 23, 1905, daily painting with Lake's pigment was begun and on the 30th part of the right arytenoid was clipped away. The patient was discharged to the sanatorium on July 5th with the larynx quite healed, no disease being visible and a small puckered scar marking the site of the operation. She is now in service; I have examined her today and find the larynx absolutely normal. The scar of the operation is just visible, but there is no sign of disease.

"The third group consists of the hopeless cases in which no local cure can be expected, cases where there is advanced or acute disease of the lungs, rapid loss of weight, hectic fever, severe cachexia, or miliary tuberculosis. In cases of this class the treatment must be entirely symptomatic; if there are no severe symptoms, only such mild measures as do not trouble the patient should be employed. Careful attention to the administration of easily swallowed non-irritating food, and the use of sedative inhalations or, better, oily solutions in a nebuliser will do much to ease the patient. With tolerant patients an oily intratracheal injection containing menthol, 1 per cent., creolin or guaiacol, 2 per cent., etc., seems to improve the local condition and give relief. But if dysphagia supervenes such treatment is not enough. Morphine and cocaine take away the last remains of appetite and hasten the end; they should only be used when the case is near its termination. Orthoform is much less harmful and, given as an insufflation, often acts remarkably well, while its effect may last

as long as 24 hours. But for the relief of dysphagia surgical measures rank far above all analgesics, and in my opinion no patient need, or should, be allowed to die with severe dysphagia from tuberculous laryngitis. The clipping away of even a small piece from the swollen arytenoid or the removal of even part of an infiltrated epiglottis may be relied on almost instantly to relieve this distressing symptom. The operation takes but a few seconds and causes little disturbance. Subsequently orthoform may be employed and is better absorbed through the wound than from unbroken epithelium. The use of surgical measures as a palliative in advanced cases with dysphagia has not received from the profession the attention which it deserves. I can quote numerous examples, but I will confine myself to cases of removal of the epiglottis, both because this structure is rarely involved except in advanced disease of the lungs and larynx and because the resulting dysphagia is particularly severe. This operation has until recently been little practised.

"In the 12 months from December, 1904, to November, 1905, I had 13 cases of massive infiltration of the epiglottis in the wards of the Mount Vernon Hospital. In eight of these I removed the epiglottis; of the remaining five one had no pain on swallowing, in two the pain was very slight, and in the other two there was marked arytenoid swelling and pieces were removed from this region with the result that the dysphagia was entirely relieved in one case and very much improved in the other. So that I operated in every case where severe dysphagia was due to epiglottic infiltration. The operation is rapidly performed, is hardly painful after the careful application of cocaine, and is never followed, in my experience, by more than the most insignificant bleeding. It may therefore be performed on almost any patient, however ill. Of the eight cases of excision I have already described one in which a complete local cure resulted. This is altogether an exceptional case, for the epiglottis is seldom attacked until the rest of the larynx and the lungs are extensively diseased. Lake has met with a similar case. Of the remaining cases of excision, as also of the five in which excision was not performed, all are now dead, as was to be expected, for they were in the last stages of disease; but in every case of

excision the dysphagia, which was severe, was much relieved and nearly always completely abolished, nor did it ever become severe again till death. Two patients left the hospital in fairly good health and remained alive for rather over three months; one of them, indeed, was seeking employment. The others remained alive for six and a half weeks, four weeks, four weeks, 25 days, and seven days respectively. In none was life shortened; in most it was undoubtedly prolonged, and in all the end was made incomparably easier. I should like to point out that I have only performed this operation when dysphagia was severe; where a good quantity of food could be taken I have held my hand, keeping to the rule that the treatment of these cases of advanced disease should be purely symptomatic."

A. Alexander[1] also reports a number of cases in which active treatment by curette or forceps resulted in cure of the laryngeal disease. Lactic acid and other pigments were first used unsuccessfully.

Henrici[2] discusses the *curative value of tracheotomy in tuberculosis of the larynx* and adds another case to the three previously reported by him. All of his patients were from 11 to 13 years old, the laryngeal disease was well marked and grew worse rather than better under local treatment. The laryngeal disease seemed to be primary, or at least the lung involvement was either very slight or not ascertainable.

The larynx healed in every case and the general condition markedly improved. Local treatment of the laryngeal ulcerations was suspended after the tracheotomy.

The author gives the following indications for the operation if it is to be done with the expectation of a cure:

1. Youthfulness of the patient.
2. Absent or insignificant changes in the lungs.
3. Relative mildness of the disease.

1. In childhood and youth, while the tendency to tubercular infection is greater the tendency to recovery is also greater under favorable surroundings. At this age tracheotomy is well borne, the danger from pneumonia being much less than in advanced life.

(1) Berliner klin. Woch., Feb. 26, 1906.
(2) Archiv für Laryngol. u. Rhinol., B. 18, H. 1.

2. The better the condition of the lungs the greater the chance of recovery. By limiting the curative operation to those cases in which there is little or no involvement of the lungs the number of operative cases will be, of course, a very small per cent. of the whole, but the curative effects will be almost certain.

3. The relatively mild type of the disease may be determined only by observation. The tendency will be to infiltration rather than ulceration, and the signs of inflammation will be not very marked. The spread of the disease will also be slow.

Henrici remarks that his indications for the operation are quite different from those usually given, because he is presenting it as a curative measure while in general it has been resorted to only as a means of palliation.

He contrasts tracheotomy with laryngotomy as advocated by Hansberg and concludes that the former is to be recommended because it is easier, less radical and causes no damage to the vocal cords. Then, too, tracheotomy should be done a week beforehand as preliminary to laryngotomy and it would be better to delay the latter operation for some weeks or even months in order to see if the curative effect may not be secured without the more radical operation.

Syphilis. A. B. Kelly[1] states that the various forms of hyperplasia found in the pharynx or larynx in late hereditary syphilis may be conveniently classified as follows:

1. Hyperplasia associated with ulceration; frequently seen as thickening at the periphery of ulcers or scars.

2. Hypertrophic granulations and papillary excrescences, which may or may not be preceded or followed by ulceration; the condition is oftenest seen on the epiglottis, and resembles lupus.

3. Tumor-like hyperplasia.

4. Diffuse hyperplastic infiltration.

He writes especially of the last form and describes a case in a boy of 7 years. There was no pain or difficulty in swallowing and no history of sore throat. Breathing was rapid with loud stridulous inspirations.

The uvula, excepting a small normal portion at the tip,

(1) Glasgow Med. Jour., November, 1906.

and the mesial part of the soft palate, were seen to have undergone a marked uniform thickening. The infiltrated area was smooth, pale, and of a hard fibrous consistence, so that the enlarged uvula formed a firm, unyielding mass. There was no ulceration. The pharynx was not otherwise involved. The nose and nasopharynx were normal. The epiglottis was also normal. The arytenoids were greatly changed, and formed two large, pale, smooth masses, which pressed closely together and moved but slightly on phonation and deep inspiration. The upper orifice of the larynx was thus reduced to a small triangular opening between the infiltrated arytenoids and the epiglottis, and was too small to allow of inspection of the parts below. None of the stigmata of congenital syphilis were present.

Specific treatment resulted in some improvement, but the enlargement of the arytenoids remained almost the same, even after two years. Such a case is in constant danger, as the slightest edema or spasm may bring on asphyxia. Kelly quotes several similar cases from the literature and emphasizes the fact that a symmetrical hyperplasia of the laryngeal mucous membrane, unaccompanied by ulceration, may appear as a manifestation of congenital syphilis in a patient presenting no other sign of the diathesis, in whom only slight improvement is obtainable by antisyphilitic treatment.

Keratosis. A case of this rare disease is recorded by A. L. Turner,[1] who cites 4 other cases from the literature. His patient was a man of 64 who had worked as a coal miner for 35 years, but for the last 10 years had worked out of doors. Had been hoarse for 12 months after having taken a severe cold: Nose, fauces and pharynx showed nothing abnormal. The upper surface of the right vocal cord throughout its entire length presented an irregular mamillary like appearance—the free edge of the cord having an irregular outline. Posteriorly this appearance was not confined to the true, but passed without any delimitation on to the upper surface of the false cord. The anterior two-thirds of the left vocal cord showed an exactly similar appearance, but here the condition was limited, the false cord being unaltered, and the posterior third of the

(1) Edinburgh Med. Jour., April, 1906.

true cord showing no alteration from the normal. The affected areas were of a greenish-white color. On closer inspection, the impression conveyed was that the affected parts were covered by a firm membrane made up of a number of small pin-point excrescences projecting above the surface of the surrounding mucous membrane, not unlike a number of small stalagmites, which could not, however, be separately differentiated the one from the other. In the other reported cases also the keratosis affected only the larynx, while the color of the patches was described as snow-white or chalk-like.

Papillomata. These troublesome growths, especially in children, are so difficult to cure permanently that a suggestion by A. Bronner[1] that they be *treated by formalin spray* is well worth notice. He describes a case in a boy of 10 in whom papillomata developed rather suddenly after an acute laryngitis. After the hoarseness had lasted about a year and several attacks of glottic spasm had occurred the boy came under Bronner's care. Only one tumor was apparent, pedunculated, and growing from below the anterior commissure. Most of the growth was removed with forceps, resulting in marked improvement. There was recurrence in a few weeks, numerous small papillomata now appearing on the cords. These were twice removed, recurring each time. After a third removal a formalin spray, 1 to 100, was prescribed and there was no further recurrence. The spray was continued for some months, the strength being increased to 1 in 50 and used several times a week. Bronner has previously reported a case in an adult in which the growths after recurring several times after removal by forceps were finally cured by a formalin spray. He thinks it possible that by the use of this method the necessity for tracheotomy in children may be avoided.

In reporting a case in a girl 2½ years old F. R. McCreery gives an excellent *resume* of the literature, which we quote here as representing the present status of the treatment of these cases:

According to the article in von Bergmann's "System," papilloma of the larynx in children is not infrequently

(1) British Med. Journal, Nov. 24, 1906.
(2) Medical Record, July 14, 1906.

congenital. It is then usually of the multiple, diffuse, cauliflower variety. They grow rapidly, and speedily recur after removal. This tendency to recur diminishes from year to year. Rosenberg's statistics up to 1896 of 109 children on whom laryngotomy had been done 143 times, showed 40 cured, 43 recurred repeatedly, and 20 died, mostly from recurrence and suffocation. Eleven of these children were operated on twice, 3 three times, and 1 seventeen times. Fifty-two were under four years of age. Percentage of cures, therefore, is 36. Eighty-eight children, of whom 13 were under four years of age, were operated on by endolaryngeal methods; of these 40 were cured. Percentage of cures, 45. Three died, and 16 were relieved. The results of endolaryngeal treatment, though very bad, are, therefore, better than those of laryngotomy.

The statistics of another series of 127 cases quoted from von Bergmann's "System" are as follows: No operation, 48 cases, 32 of whom died, 28 from suffocation, and 3 recovered spontaneously. Tracheotomized, 26 cases, 7 of whom died from the operation. Laryngotomized, 21 cases, 8 of whom were cured. Intralaryngeal methods, 40 cases, 13 of whom were cured.

This series gives about the same percentages of cures by laryngotomy as the previous series.

Clark of Boston reported 14 cases in children under fourteen years, these being all the cases treated in the Massachusetts General Hospital from 1889 to 1904, and being about 1 in 1,000 of children under fourteen. Of these 14 cases, 1 was cured, 5 died, 5 recurred, and 3 disappeared from view. Tracheotomy was done on 2, and both died. Laryngotomy on 1, result unknown. Intralaryngeal treatment on 11. One was cured, 3 died, 2 disappeared from observation, and 5 recurred. He advises tracheotomy if needed, and absolute non-interference till the period of active growth is past.

Dickerman of Chicago reports 5 cases. On one, tracheotomy was done, followed by laryngotomy, with recurrence and a second tracheotomy. One had tracheotomy and repeated endolaryngeal operations with final cure, one was still wearing the tube, one died before tracheotomy could be done, and one was operated on five times through the larynx with recurrences but ultimate cure. He advises

endolaryngeal treatment, with thyrotomy as a last resort.

J. E. Summers, Jr., reports 3 cases. One had laryngotomy twice with recurrence each time, then wore a tube two years, and recovered spontaneously. Two cases recovered after tracheotomy. He advises tracheotomy only.

Hunter McKenzie reports 7 cases with tracheotomy alone. Four recovered, 1 died a year and a half after the

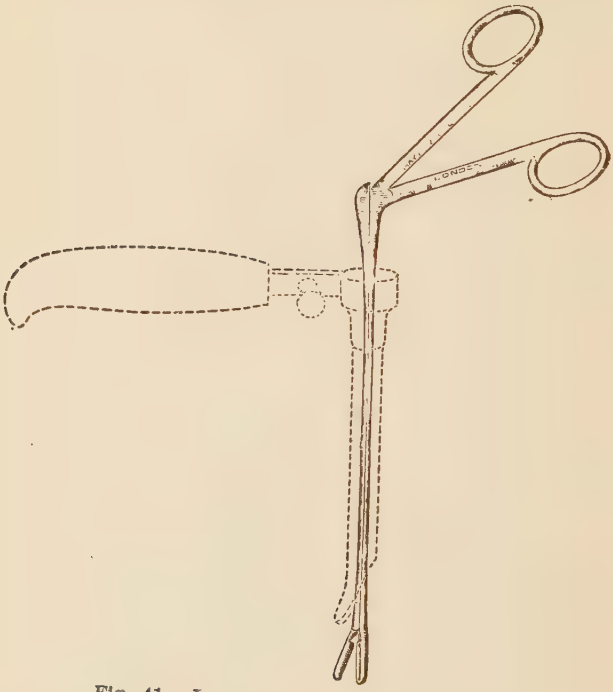


Fig. 41. Laryngeal forceps. (Paterson.)

removal of the cannula, 1 disappeared from view, and 1 was still wearing the tube. He reports 13 cases by other men resulting in cure. In 9 of these tracheotomy had been done without further treatment. In one case the tube was worn for five years.

McCreery tracheotomized his case and she was doing well 7 months afterward. He concludes that tracheotomy

with continuous wearing of the tube is the safest method in young children and he will pursue this line at least until his patient is older.

Since the introduction and general use of *bronchoscopy* this method suggests itself as the proper one in dealing with papillomata endolaryngeally. D. R. Paterson[1] reports on this method of treatment and suggests its general adoption. He uses Killian's tube spatula and a specially constructed alligator forceps (see Fig. 41). The operation is done under general and local anesthesia with adrenalin applied to the growths. With the patient's head hanging over the end of a table and the operator seated on a low chair removal can be accomplished quickly.

Geo. Finder[2] states that in the Berlin Poliklinik the *endolaryngeal method*, either by laryngoscopy in older children or by the Killian method in younger children, is used to the practical exclusion of laryngotomy. Repeated recurrence is met by repeated operation until the tendency to reproduction ceases, tracheotomy being resorted to when dyspnea is great.

Cancer. C. Jackson[3] gives the following summary of an extended paper on *operations* done by him for laryngeal cancer:

Of 49 cases of malignant laryngeal disease, 29 were deemed unfit for operation, 20 were radically operated upon, making 15 thyrotomies and 8 laryngectomies, 3 patients undergoing both operations. There were no deaths within thirty days of operation.

Of the 15 thyrotomies 1 was alive and free from recurrence after six years, 1 four years, 2 three years, 1 two years, and 1 three months; 2 died of general diseases, 4 were lost track of after about one year, and 3 died of recurrence, in spite of subsequent laryngectomy. Omitting the recent case, of 14 thyrotomies 11 (78 per cent.) were well at the end of one year, relatively cured.

Of 8 laryngectomies 3 were hemilaryngectomies, followed by recurrence and the total operation. (Three other hemilaryngectomies without recurrence were included under thyrotomy.) Of the 8 laryngectomies 1 lived seven

(1) Lancet, July 21, 1906.
(2) Berliner klinische Wochens., Nov. 5, 1906.
(3) British Med. Journal, Nov. 24, 1906.

years, dying of "cancer of the stomach" (details unknown); 1 lived three years without recurrence, dying of cerebral hemorrhage, and 1 eight months, dying of alcoholism; 3 cases had recurrence within a year, 1 apparent cure was lost to observation after one year, and 1 is too recent (three months) to record. Omitting the recent case, there were 3 (42 per cent.) apparent cures well at the end of one year out of 7 cases, but no absolute cures of malignancy.

Conclusions.

1. Thyrotomy is the operation of election for early intrinsic laryngeal malignant disease. Until a therapeutic cure shall have been discovered, surgery cannot hope for better results than this operation yields, if done only in intrinsic disease of very limited extent.

2. Laryngectomy is advisable in all cases extrinsic by origin or extension, provided the patient is in vigorous health.

3. There is no such thing as absolute ultimate cure of malignancy. Recurrence may take place after many years. For the purpose of comparing the relative efficiency of operative methods, freedom from recurrence for one year indicates adequate removal. Varying periods thereafter indicate varying degrees of malignancy or varying degrees of vulnerability, not repullulation of the primary process from operative inefficacy. If cancer can reappear in the stomach seven years after removal of cancer of the larynx, there is no reason why it should not reappear in the neck or the scar, where it would be called a "recurrence" rather than a "reinfection."

4. No operation other than a palliative one is justifiable in a patient of feeble general health, nor in one in good condition if he have metastasis or organic disease. Hence, in only a few cases is operation justifiable at the time they come under observation.

5. If this rule is adhered to in the selection of the case, and a careful technic, pre-operative and post-operative as well as operative, the mortality of laryngectomy can be reduced to a point where any surgeon will not hesitate to advise it. The mortality must always be con-

siderable. It is not possible to reduce it to *nil,* and it is only so in this series by reason of the small number of cases.

6. One of the greatest factors in the production of operative shock in laryngectomy, as shown by the sphygmomanometer, is the tugging at the esophagus while the larynx is being freed. This can be minimized by clean cutting without tugging or dry dissection and by a minimum of displacement of the esophagus. Cocain assists.

7. Shock, sepsis, and pneumonia can be minimized by perfection of technic, and should they occur the chances of recovery are good if the patient be in good general condition.

8. Routine surgery and routine after-care invite mortality.

9. Preoperative microscopy is often of aid in diagnosis, but it involves some risk of metastasis. It is better in any case of doubtful laryngeal neoplasm deemed operable to remove by thyrotomy the entire growth with its bed of normal tissue, and let the subsequent management of the case be determined by the then dependable report of the histological examination. When desired, a specimen may be taken in some cases by the self-illuminating tracheoscope, or through the tracheotomy wound.

10. While the surgery of malignant disease is discouraging, it need be so, in the larynx, only in default of an early diagnosis.

C. C. Rice[1] reports a case *treated by the trypsin method* with apparent success. The patient was a man of 70 with a growth on the left cord which clinically presented the appearance of carcinoma. A microscopic examination was not made, as it was feared that removal of any part of the growth might have the usual effect of lighting up active growth. The patient's mother and one brother were supposed to have died of cancer. The injections were given every second day. For ten days 5 minims, diluted with an equal quantity of water, were injected under the skin of the abdomen daily, after which the dose was increased to 7½ minims on alternate days for a week and then further increased to 10 minims. A return was then made to 7½ minims, given daily, and finally 10 minims

(1) Medical Record, Nov. 24, 1906.

daily were used. Holadin, an extract of pancreas, was administered three times daily in three-grain capsules. The treatment was continued for two months, at which time the patient went abroad. During his absence he took 100 of the holadin capsules. When he was examined again four months after the last injections the growth was found to have completely disappeared. Rice has treated three other cases without success. One was in a woman of 60 who was very near death when treatment was undertaken. Another had had the growth removed by snare and forceps and ultimately had to have the entire larynx removed. The other was in a man in poor circumstances and without proper food or surroundings. The author concludes:

"There may be one particular form of growth, and only one, which can be cured by the injections of trypsin, and it may be that the growth which we have seen removed is the particular type which can be controlled by pancreatic injections. What the exact quality of such a growth is, I do not know. All of these points must be ascertained by further study.

"It is just as remarkable that the injection of trypsin will disintegrate one form of growth as another. In conclusion common sense would teach us that the earlier a case of cancerous growth is put under the trypsin treatment, the greater the chance of success. We feel, with Professor Beard, that the doses should quickly be made as large as the patient can judiciously bear. The unsatisfactory cases, so far as I have observed, have been those which have come under treatment in very advanced stages of the disease, consequently when the general health of the patient was very much undermined. We certainly are not giving the trypsin treatment of cancer a fair trial, unless we are conserving the general health of the patient by the best of care in the way of food, sanitary surroundings, and healthful living."

Fairchild's preparations are considered the best for the treatment.

F. Semon[1] again presents the advantages of *laryngotomy* for the removal of intrinsic cancer of the larynx. Early diagnosis is necessary, while the cancer is still confined to the soft tissues. Semon advises the removal of a piece of

(1) British Med. Jour., Feb. 2, 1907.

the suspected tumor endolaryngeally for microscopic diagnosis, providing the patient's consent is gained for immediate laryngotomy should the microscope confirm the diagnosis of malignancy. He has now operated on 25 cases by this method with 80 per cent. of cures, or if a case in which the patient died of cancer of the liver 5 years after operation be deducted the percentage of cures is 76.

In cases too advanced for removal through a laryngotomy the author does not advise laryngectomy, although he does not advise the patient against it. In the discussion H. P. Butlin stated that he thought total laryngectomy justifiable as he had had some excellent results.

In a case of intrinsic cancer of the larynx in a man of 57 G. Kiaer[1] performed *laryngofissure* and removed the left cord and soft tissues and one-third of the right cord. The patient is able to speak distinctly. There had been no recurrence 3 years after the operation.

B. Baginsky[2] classifies the *methods to be used in cancer* of the larynx as follows: 1. Intralaryngeal: (a) palliative applications, (b) removal of the tumor. 2. Extralaryngeal: (a) splitting the larynx, (1) simple removal of the tumor, (2) with simultaneous removal of the diseased cartilage; (b) subhyoid pharyngotomy, (c) extirpation of the larynx, (1) unilateral, (2) total. The internal operations can be successfully carried out only when a small circumscribed tumor is accessible to intralaryngeal instruments. Splitting the larynx is to be recommended especially in the early stage of cancer and the earlier the operation the more favorable the result. In the majority of cases, after opening the larynx complete access to the diseased process is possible and the carcinoma can be completely removed. In favor of this method are the large number of recoveries and the relatively small number of relapses and the usually fair preservation of the voice as well as the relative lack of danger as the operation has almost no mortality. If the cancer is extensively diffused over the mucous membrane a complete removal of it by fissure of the larynx may become impossible, and a partial resection may be necessary. Where

(1) Laryngoscope, July, 1906.
(2) Deutsche med. Wochschr., March 22, 1906.

carcinoma of the larynx has also invaded the pharynx subhyoid pharyngotomy is indicated. The author describes the technic of the various operations for total removal of the larynx, especially that of Gluck, which become necessary in the most advanced cases.

Local Anesthesia of the Larynx. G. Frey[1] describes as follows the technic of injection for the purpose of anesthetizing the laryngeal nerves. The patient is seated in an ordinary chair. The positions of the large cornu of the hyoid bone and the upper posterior angle of the thyroid cartilage on the left side of the neck are determined by palpation. While the left hand presses the entire larynx somewhat to the left a fine needle is inserted perpendicularly to the skin under the ordinary aseptic precautions somewhat below the middle of the line joining the two marked points. When the needle has passed through the platismus it is carried quite horizontally toward the middle line. After the perforation of this muscle it is not any longer necessary to support the larynx. The needle seems to be in a free space. The point is now at an average depth of 1 cm. beneath the skin. It should not be carried any farther as otherwise the point would penetrate the membrane into the larynx.

From his experience Frey arrives at the following conclusions:

1. It is possible by means of a percutaneous and permuscular injection (1 to 1.5 per cent. cocain with about 10 per cent. adrenalin solution in physiologic salt solution) to render the superior laryngeal nerve insensible at its point of penetration of the thyreohyoid membrane.

2. This method has the advantage that by it relatively small accurately measured amounts of cocain with the addition of a small dose of adrenalin may be applied. The anesthesia is deep and complete.

3. The duration of this anesthesia is subject to somewhat large variations. On the average the useful anesthesia lasted about twenty minutes.

4. As a disadvantage of the method it may be stated that the anesthesia appears only after a certain period of latency.

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(1) Archiv f. Laryngol. u. Rhinol., B. 18, H. 2.

5. This method may be applied in all endolaryngeal and also in intratracheal operations (bronchoscopy). In the latter it is useful because in tracheal manipulations it is the region of the larynx that causes the greatest difficulties on account of reflex action. Local anesthesia is also indicated in those cases where applications of cocain to the mucous membrane are badly borne, ineffective, or out of place, as in the extraction of foreign bodies from the larynx.

BRONCHOSCOPY.

When first introduced by Killian, bronchoscopy was considered so difficult that it was supposed its practice would be confined to a very few men of special skill in large centers. Within the last two or three years it has come into general use by many laryngologists and it is found that any one with skill enough to operate in the larynx can use the bronchoscope successfully.

In a recent article Killian[1] says: "The difficulties are not such as cannot be easily overcome by knowledge and practice. It is much the same as with cystoscopy and catheterization of the ureters, nowadays one expects from every surgeon that he can carry out these procedures. Upper tracheo-bronchoscopy is not more difficult. One has only to consider the long narrow passage which leads to the bladder and contrast it with the entrance to the windpipe. The latter is wide and free and presents difficulties only in the region of the larynx, to which indeed far too much respect is paid. It resists, it is true, the pressure of the tube, but is easily soothed by local and general anesthetics. Once past the rima glottidis, the passage into the deeper parts is easy."

As to which route is preferable, the natural one through the mouth and glottis (upper bronchoscopy) or the one through an artificial opening in the trachea (lower bronchoscopy), Killian says he much prefers the former. Lower bronchoscopy should be done only in cases of necessity, as for example, where urgent dyspnea is present; where serious complications, more particularly in the lungs, have already set in and materially reduced the bodily strength;

(1) Laryngoscope, December, 1906.

where the foreign body is unusually large or of irregular shape, pointed and sharp, so that in an attempt at extraction difficulties or injuries in the region of the larynx are to be feared; and where bodies prone to swell up, for example, beans, are, to judge from the duration of their stay and the stage of the disease, already macerated and softened. Judging from statistics a majority of cases ought to be treated by upper tracheo-bronchoscopy. While lower bronchoscopy is much easier of performance, Killian believes the procedure from above is advisable in all cases except those previously mentioned because of the danger from the tracheotomy.

In operating under general anesthesia he has the patient lying on a table with the head hanging over the edge. Plate XVI shows the procedure. Atropin is used previous to anesthesia to check the bronchial secretions and to lessen the laryngeal reflexes. Cocain is also applied after the anesthetic has been given so as to obviate the danger of shock from touching the larynx just below the glottis.

Killian has collected records of 87 cases, in which success has been attained in nine-tenths of the cases.

M. Jaboulay[1] reports a case in which a tracheotomy tube slipped into the trachea and lodged in the right bronchus. The tube was discovered in its new position by the x-ray examination and extracted by grasping it with very fine forceps introduced through a bronchoscope. The bronchoscope and the cannula were removed together. The operation was accomplished within an hour. The author calls attention to the fact that this mode of intervention to be successful should be undertaken shortly after the lodgment of the foreign body in the air passages. Every physician should know how to detect or at least suspect the presence of a foreign body in the bronchi and should immediately refer the patient to a specialist for the extraction.

THE VOICE.

Stammering. The importance of beginning early in the treatment of stammering is emphasized by G. Hudson-

(1) Ann. des Mal. de l'Orielle, du Lar., du Nez et du Phar., November, 1906.

PLATE XVI.

Diagrammatic representation of tracheo-bronchoscopy with hanging head in sagittal section of frozen body. Bronchoscopy tube in position. Tube spatula. Photograph. (Page 336.)

Makuen,[1] who cites two illustrative cases. In the one case treatment was not begun till the boy was 10 years old, while in the other, also a boy, treatment began at 2¾ years. In the latter, treatment carried out by the child's father resulted in cure in 4 months. In the former, the habit had become fixed and after two months of treatment the prospects were that many months would be required to bring about a cure.

The home treatment for beginners in stammering may be carried out by any intelligent parent.

The diet for such children should be simple and nutritious. The patient should spend from a half to three-quarters of every twenty-four hours in bed. All disturbing influences and exciting amusements should be interdicted. Under no circumstances should any kind of talking be allowed during periods of emotional excitement. A systematic course of calisthenics should be instituted, and especially those free movements that tend to develop the respiratory organs. Breathing exercises should form a part of this course, and the child should be drilled in the proper methods of forced expirations, such as are used in crying, laughing, hallooing. The diaphragm and abdominal muscles should be trained to perform their part in vocalization, and for this purpose, phonetic and syllabic speech should be practiced.

HAY FEVER.

After 3 years use of the serum (golden rod variety) L. S. Somers[2] gives the following as his conclusions: 1. The antitoxin produces prompt and positive amelioration of the symptoms of hay fever in a large majority of cases. 2. In a smaller number, this is accomplished with complete disappearance of the affection for that particular season. 3. Where slight or no action is seen, it is due to improper administration; while in a very small number some idiosyncracy is undoubtedly active. 4. When results are obtained, it favorably influences all the manifestations of hay fever in the larger number of cases, while in a smaller class, one or more of the symptoms seem to be

(1) Annals of Otol., Rhinol. and Laryngol., December, 1906.
(2) Laryngoscope, May, 1906.

most markedly influenced. 5. When given during the attack of hay fever irrespective of its severity, it produces palliation rather than absolute cure. 6. When successfully used during one season, it does not prevent the appearance of the disease the following season; although there is reason to believe that a slight influence in modifying future attacks does exist. 7. The antitoxin is effective in both liquid and powder form, but the latter is preferable, as it is stable, does not require a preservative, and is more convenient for the patient.

As the serum is slow in action in some cases, Somers considers it essential to use it for at least a week before deciding that it is of no value in a particular case.

THERAPEUTICS.

R. Betey[1] gives the following estimate of the *therapeutic value of radium* in laryngology, etc. It must be admitted that the treatment is still in the stage of observation and record of facts and all failures as well as successes should be impartially recorded. A classification of cases and of results has not yet been made.

Nevertheless it may be already set down as worthy of belief that radium is inefficacious against frankly tuberculous processes in the larynx: its power to cure deep cancer is partial and insufficient. On the other hand, it causes the rapid healing of cutaneous epithelioma, lupus of the nose, certain chancroids of the lips, superficial and limited actinomycosis, and the prompt cicatrization of tongue, torpid ulcers and psoriasis of the tongue.

Alypin. This substitute for cocain has now been in use for some time. G. Finder[2] has used it in all classes of nose and throat work and finds it to take the place of cocain perfectly. It is only ½ to ⅓ as toxic, is freely soluble in water and may be sterilized by boiling without impairing its activity. It does not produce ischemia as does cocain, so that in some operations on the inferior turbinate it is preferable for that reason. It is as useful in the

(1) Ann. des Mal. de l'Oreille, du Lar., du Nez et du Phar., August, 1906.
(2) Berliner klinische Wochschr., Jan. 20, 1906.

larynx as in the nose or pharynx. It may be used hypodermically in a 1 per cent. solution.

W. C. Phillips[1] tried the drug in a 4 per cent. solution in a number of cases and concludes "that we have in alypin a drug possessing the power of producing anesthesia of the mucous membranes without any depressing systemic effects. It does not contract or bleach the tissues and its anesthetic effect is equal and probably superior to that of cocain."

Suprarenal. That there is danger from the careless use of the suprarenal gland or its alkaloid is asserted by B. H. Potts.[2] He believes the relaxation which follows the temporary constriction of the blood vessels in the mucous membrane is likely to be permanent if the use of the agent is often repeated. He cites three cases in which a solution of the alkaloid was used for hay fever or rose cold with the result that after subsidence of the rhinitis the mucous membrane of the nose remained relaxed and engorged, the condition being markedly worse than that following previous attacks.

W. G. B. Halland[3] records a case in which symptoms resembling belladonna poisoning followed the use in the nose of a little 4 per cent. cocain, and a 1-1,000 adrenalin solution. After these applications glycerite of tannin was applied to the turbinals at several points and 25 per cent. argyrol to the nasopharynx, this followed by menthol-albolene nebula. The author had often used this treatment in this patient and never before had any unpleasant symptoms followed. He is inclined to ascribe the effect to the adrenalin. The same cocain and adrenalin solution was used in a number of other cases the same day without untoward results. The patient felt as though she were taking a severe cold, the nose closed up, the throat felt hot and dry. The skin of the face and hands became markedly reddened and somewhat swollen. The pupils were dilated. The symptoms lasted about 40 minutes.

Ethyl Chlorid. D. L. Smith and J. T. Hughes[4] have been investigating the deaths reported from the use of

(1) Laryngoscope, July, 1906.
(2) Jour. Amer. Med. Assoc., Oct. 13, 1906.
(3) Therapeutic Gazette, October, 1906.
(4) Lancet, June 30, 1906.

ethyl chlorid and are able to tabulate 22. They estimate the death rate at 1 in 8,000 administrations. They conclude that this agent is a valuable addition to the anesthetist's armamentarium, but it is to be used only in properly selected cases. It is not to be used by persons unqualified to select cases and to meet emergencies which may suddenly arise during the administration.

Suction Therapy. R. Sondermann[1] continues to advocate the use of suction in the treatment of certain nasal diseases. He recommends it especially: (1) For diagnosis of disease of the adnasal cavities; (2) in the treatment of acute disease of the adnasal cavities; (3) in the treatment of purulent rhinitis in children; (4) to alter the nasal mucous membrane in ozena.

The author details an illustrative case: Woman, aged 52, suffered for many years almost daily with headache (especially in occiput) and dizziness, latterly growing worse. Nose required cleansing frequently and formerly there was considerable purulent secretion. Nose, right side, wide, lower turbinal atrophic; left side, normal; no secretion visible on either side. Suction on both sides with the head erect brought only a little sero-mucous secretion; on bending the head forward a profuse muco-pus appeared between the septum and middle turbinal. Disease of the sphenoid sinus was evident. The patient directed to use the suction apparatus 3 times daily. Four weeks later the patient was examined again and found practically well. Severe headache had disappeared after the first day's treatment and was scarcely worth mentioning afterward. The general condition and appetite distinctly improved. The greatest discharge of secretions occurred during the second week of treatment, later there was only a little serous discharge.

W. Uffenorde[2] does not speak very enthusiastically of this method. He remarks that it is hardly possible by it to remove completely the secretions from the cavities. He does not place its value in diagnosis very high and insists that it is not proper to use an apparatus which cannot be perfectly sterilized. He admits, however, that its long-

(1) Münchener med. Woch., Nov. 6, 1906.
(2) Ibid., June 12, 1906.

continued use in atrophic rhinitis will probably give favorable results.

Bier's Hyperemia in Affections of the Upper Air Passages. L. Polyak, of Budapest,[1] reviews the literature on the application of Bier's method to the treatment of nasal and laryngeal affections and describes his own observations and impressions. For the purpose of passive congestion he uses Keppler's method and has found no reason to suggest any changes in it. In private practice he recommends a garter-like band of thin, brown rubber 2 to 3 cm. (.8 to 1.2 in.) wide. This must be placed low on the neck. The congestion may be continued for from twenty to twenty-two hours, but in case of laryngeal patients it is necessary to interrupt the application two or three times by a pause of one to one and a half hours. In laryngeal cases Polyak applies the bandage in the first place two or three times a day for thirty minutes, later for an hour and controls the application with the mirror. Only in cases where the congestion is well borne is the time lengthened, until, even in cases of laryngeal phthisis, the bandage may be worn for 8 to 10 hours without any discomfort. The author has had no ill results from this method of treatment, nor have any been reported. The other method of application of hyperemia as a remedy consists in the use of a suction apparatus. Prym has recommended for application to the tonsils suction glasses connected with a bulb by means of a tube. Polyak has found that these have the disadvantage that they do not adhere closely enough and besides the secretions are drawn directly into the suction bulb. To obviate the latter difficulty he constructed a tube with a bulb at one side to receive the secretion. It is necessary to have instruments of different size and form for the different regions to which they are to be applied. The suction glass is applied not oftener than twice a day and then at most three times for five minutes with corresponding interruptions. The patient during the application of suction should incline the head so that the saliva may run out of the mouth instead of being swallowed. The author reports on fifty-six cases, including sinus disease, coryza, acute inflammation of the throat and tonsils,

(1) Archiv f. Laryngol. u. Rhinol., B. 18, H. 2.

acute catarrh of the mucous membrane of the pharynx, chronic pharyngitis, suppurative parotitis, Ludwig's angina, tuberculosis of the tongue, tuberculosis of the larynx, affections of the teeth and chorea.

The following are his conclusions: Hyperemia deserves a trial in certain affections of the upper air passages. The method is simple, easily applied and has had no bad effect in any case. Still it is to be recommended not to neglect certain precautions. Most cases are appropriate for office treatment, but patients with nasal and throat affections, at least during the first congestion, and laryngeal patients without edema, if possible at later times, should be under the physician's oversight and control. Patients with laryngeal tuberculosis should be treated with hyperemia only in hospitals. An exception to this rule can only be admitted for such specially well adapted cases as have shown marked improvement of the objective signs after a week's application of the hyperemia. Among the diseases of the nose and the accessory cavities the acute catarrhs and the suppurative inflammations and besides the chronic suppurative processes with formation of crusts and scabs, torpid ulcerative affections, tuberculosis and lupus are probably adapted to a trial of this treatment. The author would also make a trial of it in a case of scleroma. Acute catarrhal, purulent and even phlegmonous inflammations of the nasopharynx, the pharynx and the tonsil are suitable to the treatment, as also chronic suppuration of the bursa, with or without the formation of crusts, should be subjected to a combination of suction and congestion. Acute catarrhal affections of the larynx and also chronic diseases with tough or dry secretion as well as tuberculosis are diseases in which a trial of this treatment should be continued. It is not so simple a matter to determine the correct amount of congestion in the individual patient, especially in the beginning, wherever necessary experience is lacking. In general, the bandage should not be applied too loosely, but still less should one fall into the other extreme. The bandage must never seriously incommode the patient or cause any severe congestion or headache. The right grade of hyperemia is obtained when the pain present is somewhat alleviated in a few minutes. If the bandage itself causes pain, the hyperemia is badly applied and may

eventually be injurious. In the specialty of rhinology and laryngology the dictum *"ubi pus, ibi evacua"* does not so frequently find opportunity for application as in general surgery, but it may be emphasized even here, especially for phlegmonous inflammations, that Bier in general adheres to this teaching. When shall hyperemia and when shall suction be applied? The indication for the application of one or the other method can not be strictly laid down, but in general the hyperemia is better adapted for general and lasting congestion of the tissues and the suction forms only a supplement to the first mentioned process. The indications for congestion of the head are very broad, for it may be applied to all those diseases in which success may be expected from the influence of hyperemia. On the other hand, the indications for the application of suction are somewhat narrow. So far the author has applied the method to suppuration of the pharyngeal bursa and catarrhal inflammations of the nasopharynx with formation of crusts and inflammations of the tonsil and suppurative tonsillitis after incision, the suction being applied to the point of incision.

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